

The Iron Age

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The Microscope in the Workshop.*

It is a sound principle of mechanical construction that a secondary tool should never be used when the work can be as well done by a primary tool. If the capacity and the efficiency of the primary tool can be increased so as to meet every requirement, it is better to dispense with the secondary tool altogether. In the ordinary operations of the workshop the lathe and the planer are the primary tools, while the caliper with the graduated scale is the secondary tool. Let us take the most simple case. It is required to turn down a piece of metal to a given diameter. In order to make the assumed case as simple as possible we will assume the required diameter to be an even inch. The caliper is set for this unit of length, either from a graduated scale or, more accurately, from an end-measure inch with parallel faces. The setting in the latter case is done by the sense of feeling. We thus introduce an additional element of complexity, since sight is at once the primary sense and the ultimate test of a given limit of extension upon which the workman must rely. When the market is supplied with graduated scales from which any required length may be taken by the sense of feeling, it will be in order to defend the practice of relying

has been obtained; if he could turn a shaft to a required taper, and be sure that the correct angle of inclination has been maintained during every part of the operation; if he could—but I forbear further enumeration, lest the enthusiasm of inexperience may lead you to overlook the gravity of the demand for a radical change in our present methods, not only of obtaining, but of applying, measurements of length—a demand made in the interest of accuracy, uniformity and economy. It is quite worth our while, therefore, to discuss the question whether the microscope considered as an attachment to the lathe and to the planer will not enable us to dispense with that secondary tool, the caliper, in a majority of cases, and at the same time increase the precision and the economy of mechanical construction. The microscope has been generally accounted a delicate instrument, especially adapted to the minute study of delicate organisms and to the measurement of minute dimensions. By common consent it has been relegated to the laboratory of the investigator and has been considered quite unsuited to the every-day operations of a machine shop. One reason for this view formerly had great force. Until the invention of the opaque illuminator by the late Robert B. Tolles—a single prism in-

be set by means of a screw movement. Give me a vertical movement by means of an eccentric disk and a long lever-arm, and I will bring the surface of a plate weighing 100 pounds into the focus of the objective quite as quickly and quite as accurately as a similar adjustment could be made in the hands of a professional microscopist.

Having thus cleared away some of the objections which would be very properly made *a priori* against the proposal to use the microscope as an essential part of the lathe and of the planer, Professor Rogers pointed out some of the ways in which it can be most effectively used in the interest of accuracy and of economy. Illustrations were given of the applications of the microscope to four operations in lathe-work, viz.: Turning shoulders upon a shaft to a required length; turning a face-plate to a required diameter; turning a shaft to a required diameter, and turning a shaft to a required taper.

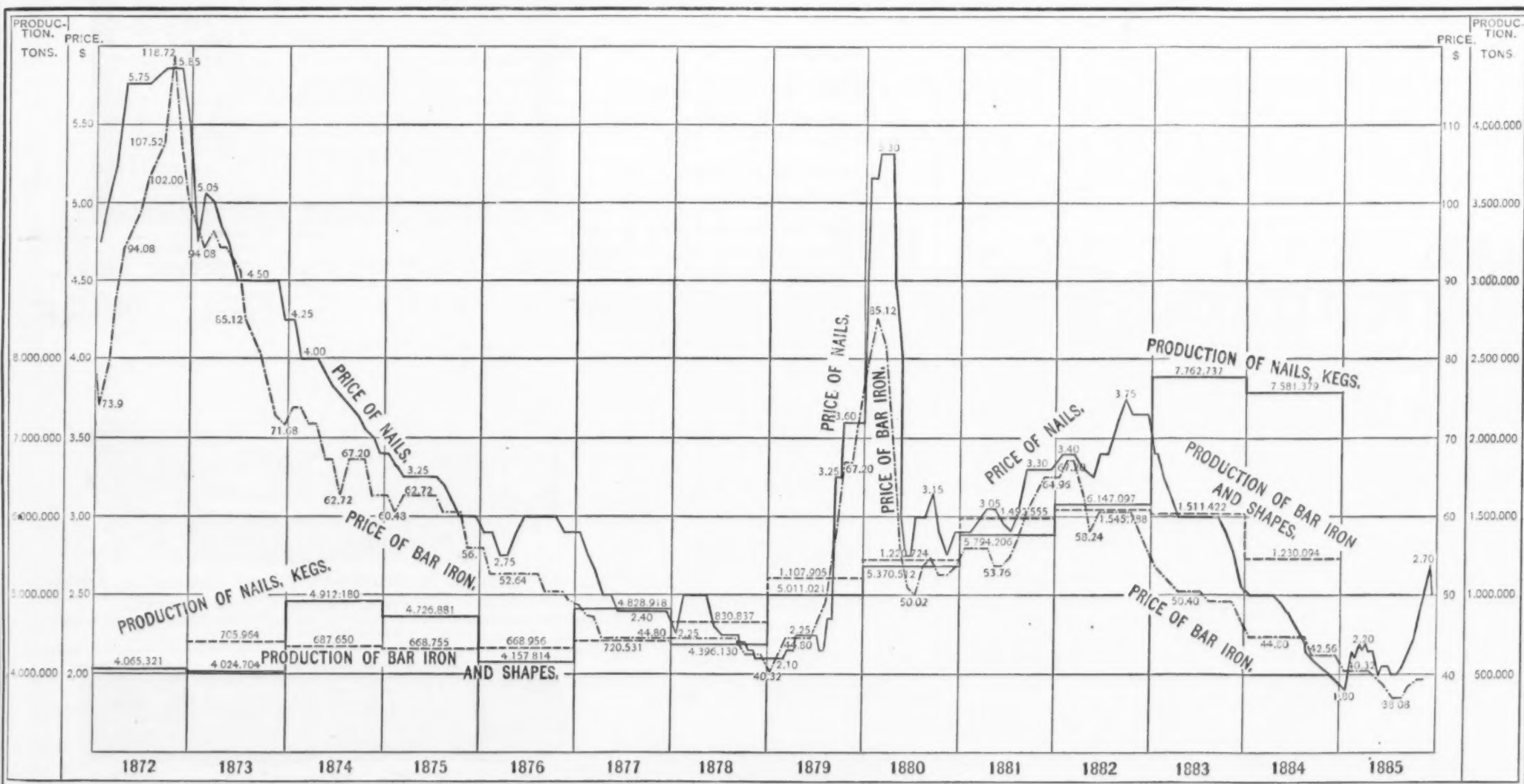
Prices of Nails and Bar Iron.

The accompanying diagram, covering the period from 1872 to 1885, gives the prices monthly of nails, in dollars, per keg, wholesale at New York, and of bar iron, in dol-

the extent of some 6,000,000 to 8,000,000 marks (\$1,500,000 or \$2,000,000) caused by lightning. Professor Holtz has prepared statistics proving that out of 1,000,000 buildings insured against fire there are 200 struck by lightning every year, and that in the case of churches the proportion would be about 5000, reaching even 10,000 in some special districts. In spite of such facts as these, it is indeed surprising to know that not only are there many churches without lightning-rods, but that probably the number that are unprotected is as large as that of those which are properly provided.

The protection of public buildings in Germany is being more attended to, especially of those under military authority, but there are still very many which are either totally without lightning-rods, or in which the appliances are so very badly constructed that they are useless, or worse. The whole question of danger from lightning has, however, assumed a new aspect during the last 15 years, and taken increased importance not only from a meteorological and scientific point of view, but also from that of the public welfare. In 1869 the well-known meteorologist, Professor von Bezdol, published the results of an investigation he had carried out, based upon the books of the Ba-

ning risk has increased threefold. That is to say, out of any given number of buildings three times as many would be struck by lightning during 1880 as were struck during 1850. So far as can be seen, the increase is still going on since 1880, and there seems no reason to doubt that we have to deal with a steadily increasing risk of damage from this source. This is sufficient reason for urging the great importance of protecting all buildings by means of properly-constructed lightning conductors. The steady increase of the danger being thus apparently proved on the best authority and admitted, the investigators naturally tried to ascertain in which direction they might look for an explanation of the facts, and the question mainly arose as to whether the increased number of lightning strokes is caused by an increased number and increased severity of thunder-storms or whether the reason lies in some changed conditions of building, as more especially the greater use of metal in construction and in gas and water pipes, &c. The two principal authorities named above appear to have arrived at different conclusions. Professor von Bezdol holds that, so far as concerns his investigations in Bavaria, both the number and intensity of thunder-storms have increased, and that any influence of the mode



PRODUCTION AND PRICES OF NAILS AND BAR IRON.

upon this sense as a final test in measurements of extension. As a differential test it is both useful and accurate. As an absolute test it had better be abandoned. It is a makeshift at best.

Assuming that the caliper has been set to an exact inch, the workman turns the piece of metal to the required size by a series of approximations, with the ever-present risk of going beyond the required limit. During the final part of the operation he stops the lathe to test the diameter with his caliper. He then takes another chip, stops, tries, starts, stops, tries until the subtle and ever-varying sense of feeling satisfies him that he has obtained the correct diameter. But, after all, the uncertainty in the setting of the caliper remains, and this uncertainty is generally greater than that which would be found to exist in the comparative trials of the diameter. If now we increase the required unit, and especially if fractional increments are added, the problem of transferring a required length from a scale to a caliper becomes a most serious one.

Every machinist must admit that there would be a great gain both in time and in accuracy if he could be sure of knowing the exact amount of work done at any instant, if he could see and measure the varying diameter of his cylinder, and at the same time control the amount of work to be done by the manipulation of his lathe, stopping at the exact instant when the required diameter has been obtained; if he could turn two shoulders upon a cylindrical shaft to any required length in one operation, stopping the last chip at the instant the correct length

sorted between the two front lenses of an objective—the illumination of objects in the field of the microscope was for the most part obtained by transmitted light, thus requiring a transparent substance. A previous invention by Prof. Hamilton L. Smith, of Geneva, N. Y., and since patented under a slightly different form by Beck, of London, gives equally good results, but the care and the time required in adjustment and the difficulty in manipulation would prevent its use in the workshop. With Tolles' illuminator, however, it is easy to obtain at once a perfect illumination of a metal surface under almost any given conditions. It is only required that one face of the prism shall be presented toward the source of light, whether it be an artificial flame or the open sky. It has been assumed also that a machine to which a microscope is attached must be most firmly mounted upon solid piers, insulated from the building and in a room in which a steady temperature can be maintained. This is by no means necessary in ordinary workshop practice. The difficulty with regard to solidity of foundation can be practically overcome by adding mass to the machine, and the question of temperature will be taken care of by having separate standards of length of the different metals in ordinary use. Only one other objection remains to be overcome. It is the common impression that the delicate adjustments of the microscope which are continually demanded, especially the adjustment for focus, can only be made by the most delicate and sensitive means. No impression could be more erroneous. Give me a small lead hammer and I will set the stop of my comparator to a given line in half of the time and with greater precision than it can

lars, per ton in store, Philadelphia, wholesale. The latter series of figures is that collected by the American Iron and Steel Association, to whom we are indebted for bringing it up to date. The production of nails in kegs is shown by the full line, while the production of bar iron and shapes is traced in dotted lines. The figures we give include all kinds of rolled iron, exclusive of iron rails, plate and sheet iron, the unit being the net ton. It will be observed that there is a general parallelism between the lines plotted from the price of nails and of bar iron, though as a whole nails show more irregularity.

The Increase in the Danger from Lightning.

Under the above heading the German technical paper *Zeitschrift für Electrotechnik* reproduced a short time ago some exceedingly interesting statistics and considerations which go to prove the rather unexpected discovery that the amount of damage done every year by lightning is enormously increasing. Attention was drawn to the fact that, in spite of the lapse of 130 years since the first introduction of lightning-rods, only a very small proportion of buildings are supplied with them, notwithstanding the comparatively small cost of fixing them. It is only in one or two special districts of Germany, as for instance Saxony, where repeated dangers have at length brought about a due appreciation of the matter, that a really respectable percentage of houses and other buildings are protected. According to calculations made by Prof. G. Karsten, there is a yearly destruction of property to

varian Fire Insurance, which is in the hands of the Government, and in which about 90 per cent. of all existing buildings are insured. In these books accurate account would be kept of all the cases in which lightning had affected any of the insured buildings. The first results of this investigation show that there was a regular increase going on in the number of instances of lightning striking buildings, reckoned as percentage on the buildings, of course; and a later publication in 1884, giving a continuation of the figures obtained, showed the result to be that during the 50 years from 1833 to 1882 the percentage of insured buildings struck by lightning in Bavaria had increased at least threefold.

The publication of this investigation caused others to be undertaken, and one for the Kingdom of Saxony showed a similar increase. Thus it is stated that for the years 1864 to 1870 the buildings struck were in the proportion of 151 per 1,000,000 as the yearly average, while for the years 1879 to 1882 the figure has risen to 271 per 1,000,000. Again in 1880 Holtz published statistics, based upon the books of a large number of insurance companies in Germany, representing a yearly insurance sum of 13½ milliards of marks, the result being the same as in the cases already cited. Further, returns have recently been issued concerning the Province of Prussian Saxony for the two decades 1864-73 and 1874-83, and show that from one decade to the other the risk from lightning has almost doubled. The final conclusion to be drawn from this considerable mass of apparently reliable figures is that, for the whole of Germany, during the years between 1850 and 1880 the light-

of construction of the buildings is quite a secondary matter.

Holtz, however, in his investigations based on meteorological returns, fails to find any proof as to increase of storms, whereas he has prepared, at great trouble and expense, statistics to show that exactly those districts in Germany where most metal is used about the buildings are also those in which the largest number of lightning strokes are recorded. It appears clear, however, that when the explanation has to be looked for we are no longer on good, solid ground. Probably, now that these surprising facts are pretty well established and are attracting a great deal of attention in the proper quarters in Germany, very exact records as to thunder-storms will be prepared, and will in due course enable more decided answers to be given as to the cause or causes of the increase of damage done.

It would be of very great interest to know whether any returns have been prepared as to the effects of lightning in this country. Certainly no part of Germany can be less addicted to lightning-rods than we are, if we except churches and tall chimneys. It is stated in the article from which we have quoted that one or two special districts, as Saxony, are very much better provided with conductors than the rest of Germany. It would be interesting to have some definite statement as to the amount of protection which can be proved to have resulted in these specially cautious regions. The figures quoted above for the Kingdom of Saxony would appear to show that, however well it may be protected by conductors, it certainly comes in for its fair share of the general increase of lightning strokes.

* From a paper read at the Boston meeting of the American Society of Mechanical Engineers by Wm. A. Rogers.

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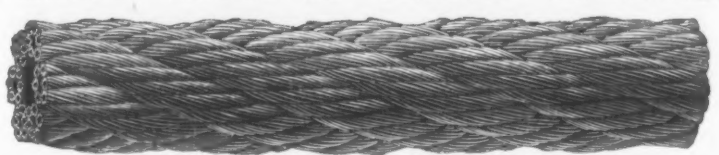
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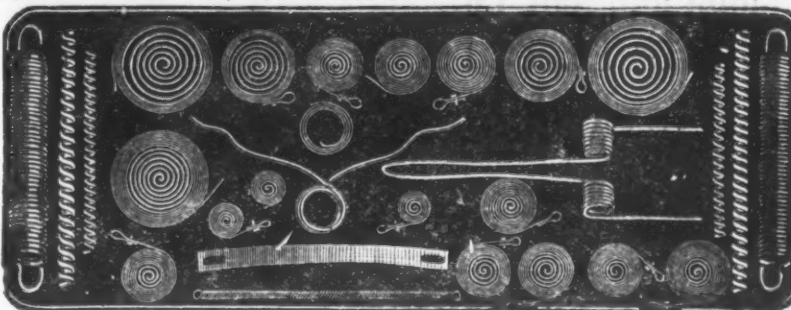
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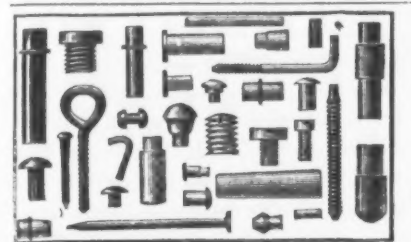
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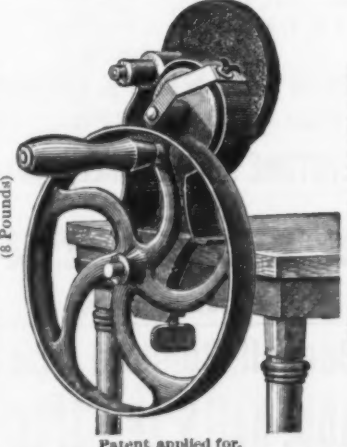


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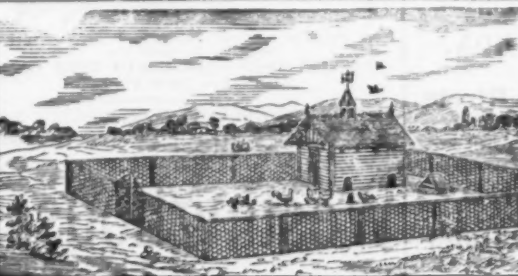
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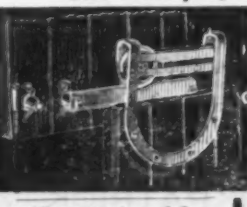
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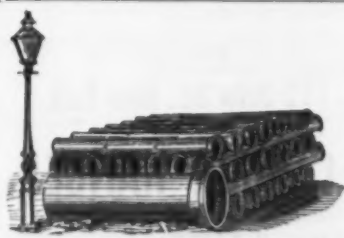
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BLOOMS, PIG IRON, BAR IRON, SHEET IRON,
STEEL and IRON RAILS, IRON CLAD STEEL RAILS
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Sheridan, Leesport, Temple, Lynch-
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Foundry **PIG IRON** and Forge
CHARCOAL PIG IRON.
Also Woodbridge Clay Mining Co.'s Fire Brick.

Gas-Engine Economy.
Under the above head the *Progressive Age*,
of Philadelphia, recently submitted an inter-
esting contribution to the subject of relative
economies of gas and steam engines. The
writer, Mr. J. F. Place, of this city, has, we
believe, given much time and attention to
the subject, and, while the correctness of
some of his statements may perhaps be
questioned, his manner of treatment and
general conclusions can justly claim atten-
tion. We quote:

It may not be generally known to engi-
neers that the gas engine is (when the per-
centage of heat utilized in the best engines
is considered) a much more economical
motor than the steam engine. The gas en-
gine, like the steam engine and hot air
engine, is simply a heat engine—a machine
through which heat energy is converted into
the energy of motion. What, then, is its
possible economy? Simply that percentage
represented by the difference between the
temperatures. The well-known formula ap-
plies: $T - T' = \text{the possibly duty, or, in}$

plain words, the absolute temperature of
combustion in the cylinder, less the absolute
temperature of the surrounding atmosphere,
divided by the absolute temperature of the
combustion in the cylinder. The tempera-
ture of combustion in this instance corres-
ponds to the temperature of the initial steam
in a steam cylinder. That is the possible or
theoretical duty. The practical economy in
both the gas and steam engine is governed
entirely by the terminal pressure and the
amount of heat escaping through the cylin-
der walls; for "surrounding atmosphere,"
then, in the above explanatory clause, should
be substituted "exhaust products," which it
in fact comes down to.

In reference to a comparison between gas
and steam, it may be well to recur to the
present economy of the modern steam engine,
and then give the best results which have
so far been realized from the gas engine as
at present constructed, without reference to
its improvement in the future, which I shall
refer to further on. But what is the econ-
omy of the steam engine? That is a very
difficult question to answer, especially when
we consider both engine and boiler as one
machine, which we shall have to do in mak-
ing a comparison with the gas engine.
Even engineers and mechanics of the high-
est reputation and varied experience on this
point widely differ; still such men as Pro-
fessor Thurston, or Corliss, Porter, Emery
or Sims may be regarded as authorities in
our own day as to economy of engines of the
most modern type. There are so many dif-
ferent engines before the public that per-
haps the most satisfactory way would be to
accept the result of a test by good authority
of some one engine of a popular class.

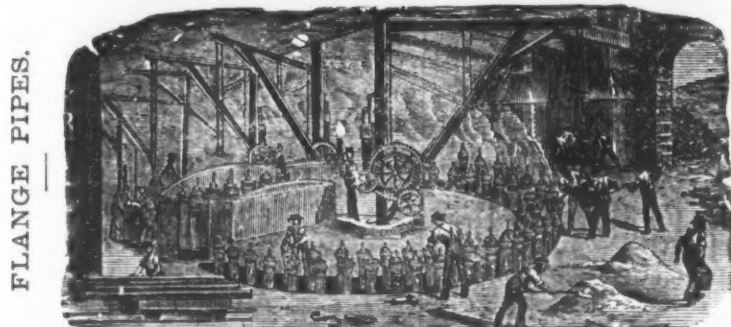
In instituting a comparison with the gas
engine I should prefer to take one from
that class of non-condensing, high-speed,
automatic cut-off steam engines represented
by such types as the Porter-Allen, or the
Armington & Sims, or Westinghouse. Of
course the automatic cut-off condensing en-
gine (the Corliss being a good illustration of
this class) or the compound condensing en-
gine would show a higher duty, but they
are in use principally for above 100 horse-
power, with which powers the gas engine is
not yet in competition. In the test of an
Armington & Sims engine, Professor Thurst-
on arrived at an approximate conclusion
that its economy was equivalent to a con-
sumption of 3 pounds of coal per indicated
horse-power per hour on a basis of a boiler
estimate of 10 pounds of water evaporation
to the pound of coal consumed. This en-
gine may be fairly taken as an average of
the class I allude to. Whether it can do
better than that, or not as well, in general
use, or whether there are others that can do
better, I will not now raise the question;
but for sake of comparison I will take the
result reported as an average one.

Let us see now what the gas engine can
do when using ordinary coal gas or water-
naphtha gas at average prices charged the
public by gas-manufacturing companies;
then what it can do where gas is obtained
at net cost of manufacture. The gas engine
as now built of the most improved construc-
tion, employing compression before ignition
in its cycle, and with sufficient expansion to
reduce the terminal pressure to not more
than 25 pounds above the atmosphere, will
develop 1 indicated horse-power to 20 feet
of coal-gas consumption per hour. Non-
compression engines require considerably
more gas. These facts I have verified by
several careful tests. At the average prices
charged for gas by gas manufacturers this
is above the cost of running steam engines
for any except very small powers, unless the
cost of attendance is reckoned into the ac-
count. In that case, as the gas engine re-
quires no engineer, it is cheaper than the
steam engine up to a limited range of power,
and for some uses has great advantages over
the steam engine on the score of convenience.
In many cases, however, gas-manufacturing
companies make a special discount from
their ordinary prices in its favor, which, of
course, reduces the cost of running and in-
creases its economy somewhat.

To give any facts as to the economy of
the gas engine compared to the steam en-
gine, when gas is furnished at its actual cost
of manufacture, I shall have to refer to its
use in England (and to English authori-
ties), where its theory is much better
understood and where its manufacture
has advanced to a much higher state
of perfection than in our own country,
and where it has, as a natural sequence,
come into much more general use. In
Europe gas engines are now supplied with
self-starters and are in successful operation
up to as large as 100 horse-power. In some
cases they are compounded, thus securing
the fullest expansion, and in others are built
double-acting.

Within the past two years there have been
introduced in England also portable gas-
making plants for making gas for single en-
gines—some from oil and others from coal.
The Dowson system, which has been adopted
to some extent, consists of a portable closed
furnace and coil boiler. Fire is kept up in
the furnace by supplying coal through a
check-valve door or opening (which con-
nects the feeding box or supply holder with
the furnace). Steam is generated and

A. H. McNEAL,
BURLINGTON - NEW JERSEY.



CAST IRON PIPES
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ESTABLISHED IN 1848.
SINGER, NIMICK & CO., Ltd.,
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For Shafting, Spindles, Rollers, &c., &c.

File, Fork, Hoe, Rake, R. R. Frog, Toe-Cath, Sleigh-Shoe and Tire Steel, &c.; Cast and German Spring and Plov Steel.

"Iron Center" Cast Plov Steel. Finished Rolling Plov Counters, with Patent Screw Hubs. Agricultural Steel cut to any pattern desired. Attached. "Soft Steel Center" Cast Plov Steel. Steel Forgings made to order.

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Best Grades of Tool and Machinery Steel.

Light Steel Rails,

40 lbs., 35 lbs., 30 lbs., 25 lbs., 20 lbs. and 16 lbs. per yard.

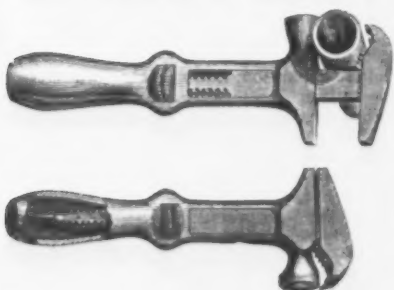
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Best Material and Finish,

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STEEL CASTINGS
FROM
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We wish to give special attention to making Cast Steel Rolls of all sizes, Mill Gearing wherever Cast Steel is suitable. Also Cranks, Cross Heads, Shafts, &c., for Steam and Blowing Engine construction. Being desirous of securing a share of public patronage, we will endeavor to make our product equal in quality to any in the market.

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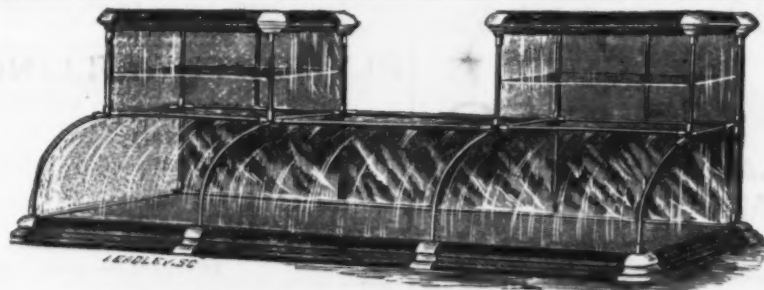
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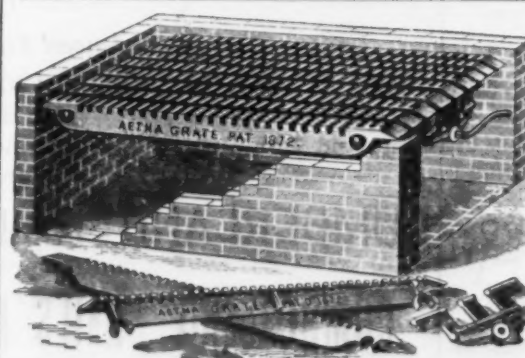


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Manufacturers of **SHOW CASES** of every description. Agents wanted in principal cities. Branch stores, 30 and 41 West Broadway, New York; 677 Broadway, Albany, N. Y. Catalogues sent on application. Mention The Iron Age.

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THIS IS A PRACTICAL AND THOROUGHLY SUCCESSFUL

SHAKING GRATE BAR.

Has been in use over five years, and in many of the largest manufacturing concerns in the country. Simple in construction, positive and effective in its operation, easily worked (being operated in sections in wide furnaces); gives over sixty per cent. Air Surface; very durable, interchangeable, and can be put in any furnace without delay or change of any kind. Descriptive circular, price, &c., sent on application.

Aetna Grate Bar Comp'y,
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Wrought Bar Agricultural Wrenches



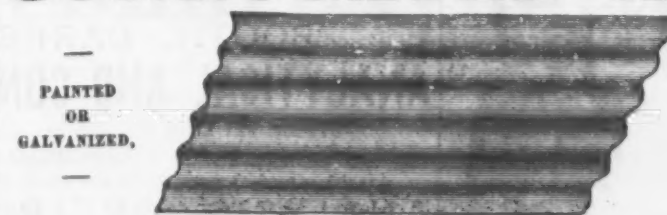
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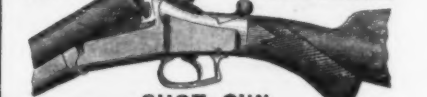


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Iron, Steel and German Silver SCREWS.
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We Challenge the World to Produce its Equal.
Sample Pair sent postpaid on receipt of price.



CHAMPION
SINGLE BREECH-LOADING



SHOT GUN.

Top-Trap Action, Pistol Grip, Rebounding Lock, Patent Fore-end Fastening. For good workmanship, convenience of manipulation, hard and close shooting, durability, and beauty of finish, this Gun has no equal and challenges the world.

PRICES: Plain Barrel, 12 bore, \$15.00 - 16 bore, \$16.00.



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HAND CUFF

PRICES:

Cuff, Plain, \$4.75

Cuff, Polished, 4.00

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Special catalogue of Police Clubs, Hand Tuffs, Leg Irons, Police Hooks, Chain Twisters, Pocket Hoisters, Police Dark Lanterns, &c. Sent Free on application.



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Using 38 S. & W. C. F. Cartridges. Sent postpaid on receipt of price.

Send for large catalogue of Roller Skates, Rifles, Revolvers, Air Rifles, Police Goods, Guns, etc.

JOHN P. LOVELL'S SONS, Boston, Mass.

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Cheapest and most durable all-metal clamp skates. Particularly adapted for Rinks. Can be made to any size by changing the connecting rod. It is made of a good quality of special steel, heavily nickel-plated. It has durable rubber cushions, and is provided with the best boxwood wheels. Sample pair sent to any address on receipt of price, \$2.50. One dozen pairs, \$24.00. Address GOLLNER MFG. CO., 222 Centre Street, New York. 127 General Agent wanted.

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ALSO TACK AND NAIL PLATE.

Blooms guaranteed and especially adapted for stamped ware.

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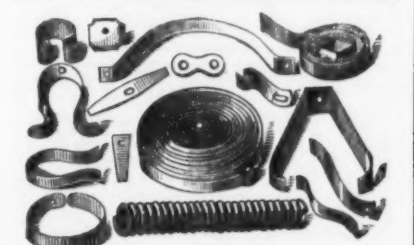
the Trade.

247 & 249 Pearl St.,

New York.



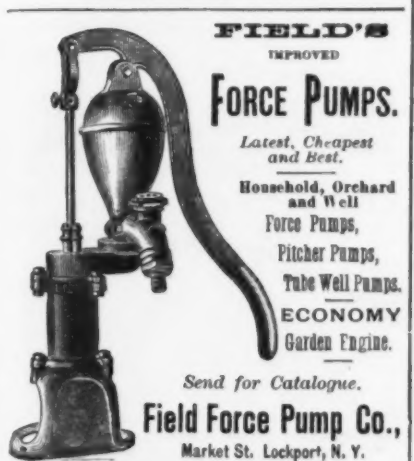
Put size of Band for Brass and Tinned Wire Cages.

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Manufacturers of

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of every description, from best Cast Steel.

BRISTOL, CONN.**FIELD'S**

IMPROVED

FORCE PUMPS.

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Force Pumps,

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ECONOMY**Garden Engine.**

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Manufacture and sell the following celebrated brands

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Pamphlets showing sizes of grain sent free.

**NEW MAKE OF MINE LAMP.**

THREE DIFFERENT

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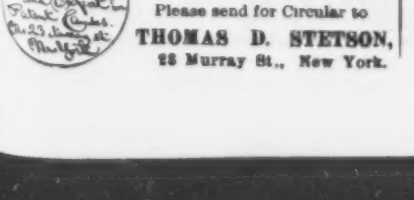
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Pumps and other Hydraulic Machines in the World.

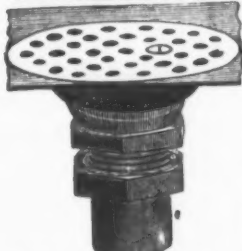
FIG. 120.



FIG. 200.



FIG. 70.

**Wrought Steel Sinks.**

One of the strong points of these sinks is the new coupling with which they are now supplied and which is pronounced by all plumbers the best on the market. It is used with both lead and wrought-iron pipe; is a neat, reliable coupling, and is easily detached for the purpose of pumping out the pipe. The strainer and all parts of the coupling are tinned, and are furnished with all sinks without extra charge.

The fact of the great strength and durability of this sink, as it is practically free from danger of breakage in transportation, handling or use, is a strong point in its favor, and that its merits are recognized by most competent judges is evident from the fact that leading houses which have been interested in the common article have taken up the Wrought Steel Sink. Twenty-five per cent. is saved in freight by purchasing Steel Sinks. Orders come from all parts of the United States, Canada, Europe and Australia.

BRANCH WAREHOUSES:

85 and 87 JOHN STREET NEW YORK, and 197 LAKE STREET, CHICAGO, ILL.

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FIG. 114.



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SKINNER'S PATENT COMBINATION CHUCK.

Plain and Ornamental Butts,

Single and Double Acting Spring Hinges,

Union Coil Door Springs,

Galvanized Pump Chain,

Patent Rubber Buckets,

Wooden Well Curbs, Wood Tubing,

Iron and Brass Pumps.

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Hand Force Pump.

It is made of brass, is strong and light, and is the best pump of its kind in the market. Write for prices.

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Warehouses, 103 Chambers St., New York, and 164 Lake St., Chicago.

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THE E. & G. BROOKE IRON CO.,

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MANUFACTURERS OF

ANCHOR NAILS AND SPIKES. BRAND

Capacity, 1000 Kegs per Day.

Made from their own Pig Iron, Insuring Regularity and Superiority in Quality.

ALSO

FOUNDRY AND FORGE PIG IRON,**AND COLD BLAST CHARCOAL CAR WHEEL IRON.****OLD DOMINION CUT NAILS, BAR IRON.****R. E. BLANKENSHIP, President,****RICHMOND, VA.****IRON AND STEEL DROP FORGINGS**

All shapes, small and large, including

GUN, PISTOL, WRENCH BARS, &c. ALSO, DIE SINKING, MANUFACTURERS ALSO

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THOMAS DEVLIN & CO.,

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of Carriage and Wagon Castings constantly on hand for the trade.

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For House Doors, Car Doors, Elevator Doors.

Frictionless. Indestructible. Perfect. Send for Circular.

CONHOES IRON FOUNDRY & MACHINE CO., CONHOES, N. Y.

superheated in the coil by gas jets below, and the pressure (about 25 pounds per square inch) forces it into the furnace below the grate, and, on the injector principle, forces a quantity of air along with it. The usual reactions take place; the oxygen of the air and decomposed steam combines with the carbon of the coal and the hydrogen is released. The composition of the gas is, approximately, hydrogen, 20 per cent.; carbonic oxide, 30 per cent.; carbonic acid, 3 per cent., and 47 per cent. nitrogen. As stated by Mr. Dowson, a gallon of water and 12 pounds of anthracite coal produce 1000 feet of this gas. Its net cost, including coal, attendance in making, interest on plant, &c., with coal at \$5 a ton, would be about 5 cents per 1000 feet. At that rate, and by using five times as much of coal gas to secure an explosive mixture (on account of the smaller proportion of hydrogen in it), a gas engine of 10-horse-power would use 100 feet an hour per indicated horse-power (or 1000 feet an hour for a 10-horse-power engine), which is equivalent to a cost of 1/2 cent per hour per indicated horse-power.

The tests made by Messrs. Crossley Bros., Manchester, England, of several Otto engines, and by Mr. D. K. Clark, engineer to the Smoke Abatement Committee (Manchester), show that the above economy was more than sustained. The two engines at Crossley's ran on Dowson gas 35 weeks, and gave an aggregate average of 150 indicated horse-power, and the consumption of fuel was 1.3 pounds of coal per horse-power per hour. Mr. Clark states the result of his tests to have been 1.4 pounds of coal per indicated horse-power per hour. From another report of a local board of works at Edmonton, I see the result is stated to be 1.2 pounds of coal consumed per indicated horse-power per hour. At \$5 a ton of 2000 pounds, coal costs 1/2 cent a pound. Taking the large amount consumed at these tests, say 1 1/2 pounds an hour, and the cost is 3/4 cent for 1 indicated horse-power per hour—which is equivalent to 3/4 cents an hour for a 10-horse-power engine, or 37 1/2 cents a day of 10 hours' running. I will add that gas engines are now in general use in England as large as 50 horse-power, and that their economy, where gas is specially made for the purpose, will average not above 1/2 cent an hour per indicated horse-power.

With such results before us from the gas engine, as imperfect as it now is, what may we expect from it in its improved form? Even in Europe, where its best types are found, it has serious defects, which will be remedied. But little or no attempt has so far been made to improve its economy. Manufacturers have been content to commend it simply on the score of convenience, since there was a good demand for it because it was a gas engine. Its economy can and will be greatly improved. Its most serious defect on that point as now constructed is its wastefulness of heat. In the cycle of the gas engine heat escapes and is lost: 1, by conduction through and from the cylinder and all its parts; 2, with the exhaust products, which are necessarily discharged at a much higher temperature than the surrounding atmosphere. How can these losses be avoided? is the practical question. The use of a water-jacket increases the loss of heat by conduction, as it is then simply absorbed by the water; and the cooler the water is kept the greater is the loss of heat. But the water-jacket is a necessity in the compression gas engine in order to keep the heat down to a point that the piston can be lubricated, and compression before ignition is now recognized as the first requisite to economy. To keep the cylinder, then, at a temperature not below boiling water may be fixed as the limit of economy on that score, at least for the present.

The difference of temperatures between that of the exhaust products and that of the surrounding atmosphere represents the loss of heat which escapes with the exhaust, and this loss is very large in the best type of gas engines of the present day—fully equal to 20 per cent. of the heat evolved in the cylinder, which is more than the total available heat utilized in the modern steam-engine cylinder. How can this escaping and wasted heat or any portion of it be saved? This question early came home to Watt in his study of the steam engine over 100 years ago, and the result was greater expansion (or "compounding") and the condenser, which reduces this loss to the minimum. This method of economy, however, cannot be applied to the gas engine. But the greater heat of the combustion in a gas engine over the heat of steam, and the consequent excess of difference in temperature of gas over steam between the initial and terminal pressures, is largely in favor of the gas engine, and more than makes up for its excessive loss of heat with the exhaust, even as at present constructed. Although the condenser cannot be made use of, it is entirely practicable to save a good portion of the exhaust heat by utilizing it to heat the compressed charge before ignition. How much can be saved in this way is simply a matter of mechanical appliances. If one-half only is saved, and the heat of the exhaust products reduced to one-half what it otherwise would be, a largely increased economy would be at once realized, equal to 10 to 12 per cent. of the available heat, and over 50 per cent. increase in the present average economy.

By a similar contrivance to the regenerating plates of the hot-air engine as now built, or by passing the hot exhaust in tubes through the incoming compressed charge, one-half of the waste exhaust heat can be easily utilized, and possibly very considerably more. It is calculated that the loss of heat through the cylinder walls and water-jacket of the gas engine is about 50 per cent. of the heat evolved. Deducting this and the exhaust and radiation waste, and we have a net utilization of 20 per cent. of the heat energy of the fuel (gas), which, although less than it ought to be, and much less than it will be in the future, is at least 7 per cent. better than the best type of steam engines, and probably 10 per cent. to 15 per cent. better than the average. Of course I consider in this approximate comparison the loss of heat through the boiler of the steam engine in converting water into steam, which great waste can never be avoided. With large gas engines of upward of 25

horse-power the percentage of loss through the cylinder walls is considerably less, and the economy, of course, correspondingly larger.

The gas engine in America is yet crude. The largest number of those now built do not even employ compression, which is the most important adjunct to their economy; the waste products are allowed to mix with the new charge, thus retarding combustion; and the regulation of speed is confined to the number of explosions entirely—methods, all of them, which ought to have been dropped several years ago. No attempt has been made to introduce portable gas-making plants, as in Europe, and which eventually will be required for sizes above 5 or 10 horse-power, in order to compete with steam; and self-starters, which are so common across the Atlantic, are as yet unknown here. The gas engine is indeed yet in its infancy; still it is popular, and its convenience has brought it largely into use. The attention of engineers is now being directed to improving it, and when even a part of the defects I have named are corrected, which they very soon will be, we may expect to see the engine very much advanced in economy, and within a short time a very strong and successful competitor of the steam engine.

Oxygen in Metals and Alloys.*

BY PROF. A. LEDERBUR.

(Concluded from page 1, January 7.)

The second method of detecting the proportion of oxygen in metals is for the present applicable to but a very limited number of cases. In point of fact we know but a small number of solvents capable of dissolving a metal without attacking its oxygenated combinations; and the difficulty is enhanced by the habitual presence of foreign bodies, on which the application of the solvent produces quite a different effect from what it does on the metal. For example, iron is entirely dissolved in a solution of ammoniacal chloride of iron or of copper; but oxides of iron are not the only insoluble products remaining; there are also left sulphurets, phosphorides, silicides, carburets, &c., besides manganese. We are not acquainted with any method of separating these various compounds. The same thing may be said with regard to alloys of copper with zinc and tin. The use of chlorine gas to volatilize the unoxidized metals does not yield satisfactory results, especially because some of them, like copper, are volatile in the current of chlorine only at a high temperature. All this goes to show that there is a wide scope for experiments in this department of analytical chemistry. For the present we must be satisfied with the returns derived from either of the two methods referred to. Even they may, when carefully conducted, yield some valuable conclusions as to the behavior of the metals examined.

In the cases we are about to speak of, the proportion of oxygen was ascertained by means of a current of hydrogen. This gas, having been produced by action of sulphuric acid on zinc free from arsenic, was purified on its way: (1) In a solution of caustic potash containing oxide of lead; (2) in concentrated sulphuric acid; (3) in a heated glass tube containing platinized asbestos; (4) again in concentrated sulphuric acid; (5) in a tube charged with anhydrous phosphoric acid. The pure and dry hydrogen then penetrated into a tube of about 60 cm. in length and 18 mm. in diameter, arranged in a Muencke combustion furnace. In this tube was the vessel with the analyzed metal filings or shavings in it. On issuing from the pointed tube the hydrogen entered a U-shaped tube containing phosphoric anhydride. The hydrogen was eventually set free, after passing through a last washing vial containing sulphuric acid and enabling the operator to see that all the joints of the apparatus were hermetically sealed, and, in case of absorption, to prevent the moist air from turning back into the U-shaped tube. To divide the analyzed sample either a file or a well-tempered drill was used. The tools, being first washed in alcohol and then in ether, and afterward dried in a soft heat, were first used to file hard metal, for it has been noticed that, despite the precautions taken in cleaning the tools, the first fragments of metal divided with them are always tinged with fatty substances. In these experiments I thought I could get on without purifying the metallic filings by heating them in a current of nitric gas, as I used to do. Experience has made it clear to me that filings obtained with the precautions mentioned yield, when analyzed, results as accurate as those obtained with filings heated within a current of nitric gas.

When the vessel was charged with fragments of metal and fixed in the combustion-tube the whole apparatus was filled with hydrogen gas, and then, after the water-condensing tube had been connected, heated in such a way as to be brought to red heat in the space of about 25 minutes. This temperature was kept up for half an hour, and then the fire was gradually let down, while a regular current of hydrogen was still applied to the tube. When all was cooled down the absorption-tube was removed, the hydrogen swept away by a current of air dried in sulphuric acid and phosphoric acid, and the weighing process performed. Not from copper alone, but from all the alloys of copper and tin that have been experimented on, sulphureted hydrogen has been produced, which, on issuing from the apparatus, could be readily perceived by the olfactory organs. The escaping gas deeply colored a test paper soaked with acetate of lead. The alloys of copper and zinc have never occasioned the least escape of sulphureted hydrogen, although the presence of sulphur clearly appeared in the analysis. From this it may be inferred that when an alloy with a copper basis—i. e., a bronze—contains zinc the sulphur is combined with this metal in the form of sulphuret of zinc irreducible by hydrogen. My experiments have yielded the following returns:

Copper and Bronze.	Percentage of oxygen.
Ordinary copper as usually sold.	0.257
Copper-plate.	0.134
Dense copper, cast under a layer of salt.	0.094
Bronze from the Royal Arms Factory, Spandau, containing 4 per cent. of tin.	0.070

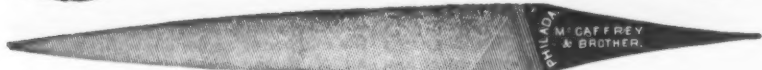
* Chemiker Zeitung.

Paris, 1878.

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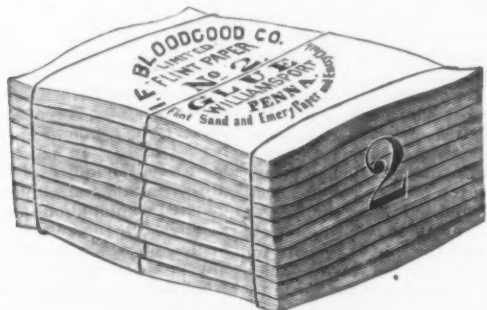
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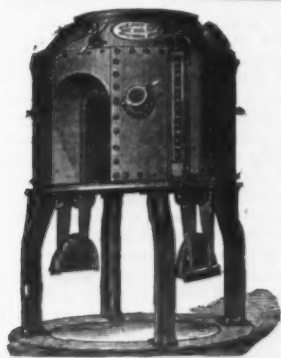
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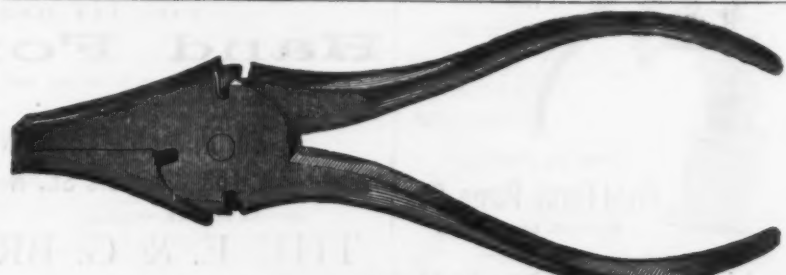
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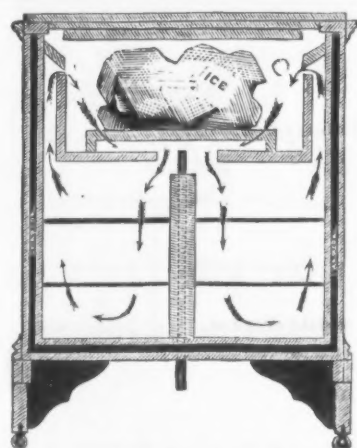
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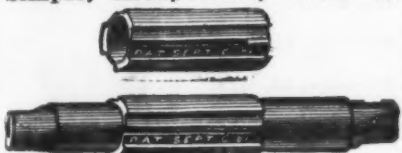
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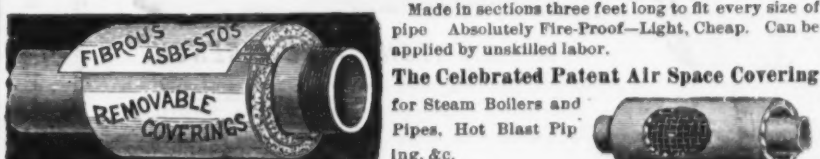
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taining 0.04 per cent. of phosphorus 0.088

The percentage of oxygen in copper as usually sold is much the same as that found by other observers—e. g., by Hampe. There is nothing surprising in such a proportion in copper, considering the circumstances under which this metal is cast, but 0.227 per cent. in the above copper probably considerably affects its ductility. The oxygen found in pure tin bronze partly arises from the materials used and partly from what goes on when the alloy is made. The less reducing the flame and the lower the temperature at which bronze is cast the less is the metallic bath likely to absorb the oxygen. The fusibility of bronze increases in direct ratio to the proportion of tin contained therein, and therefore the melting can be carried through with a more powerfully reducing flame. One thing that tends to still further reduce the percentage of oxygen in tin is, according to Balling, that property of metallic tin which consists in its capacity of dissolving very much less of its own oxide or of other oxides than copper is capable of doing. From the foregoing it is plain that bronze containing most tin must logically contain least oxygen. If, notwithstanding this, the bell bronze containing the largest proportion of tin of the three samples examined yielded the largest proportion of oxygen, this phenomenon may be accounted for by sundry reasons. In the first place, bells are generally cast out of old materials more or less oxidized at the surface. In the second place, the metal subjected to analysis was one prepared at a time when casting arrangements were still very imperfect, so that the metallic bath was probably in a condition very well suited for absorbing oxygen to the extent of saturation. Besides, many bell-founders, even at this present day, cling with all their might to the traditions handed down from the fifteenth or sixteenth century. They use furnaces which, being irrationally built, do not turn the heat to proper account, and work with a red and very smoky flame. Twelve hours or more elapse before the metal is brought to a liquid state, and, whereas on principle the reducing flame ought to be a bar to oxidation, it happens in practice that the longer the melting process lasts the more air gets into the furnace through cracks in the flues.

One point remained doubtful in the interpretation of the foregoing analysis. The question arose whether heating in a current of hydrogen really removes all of the oxygen or whether possibly the oxygen combined with tin did not remain behind unaltered. It is generally admitted that tin can easily be reduced by hydrogen. Still a practical man of the greatest experience, viz., Künzel, the inventor of phosphor-bronze, is of quite a different way of thinking. In his treatise "On the Bronze Alloys" (Dresden, 1875) he says: "The ordinary analytical method, which consists in heating suitably broken-up metal in a current of hydrogen and weighing the water produced, does not admit of ascertaining the aggregate quantity of oxygen contained in gun-metal; for, though oxide of copper is reduced under the conditions of the analysis, the same thing cannot be said of oxide of tin, which is not reduced by hydrogen gas, except at temperatures that cannot be attained in such tubes as are used for purposes of analysis." And in another part of the same book I find the words: "One point must be insisted upon. That is, that the tin oxide in bronze cannot be removed by another kind be removed by poling or be deoxidized, for, as all metallurgists are aware, oxide of tin is not reduced by hydrogen, hydrocarbons or oxide of carbon, except at an incandescent heat." Now, I thought it would be worth while to look and see what would happen to the oxide of tin in the case of an analysis being carried out under the same conditions as bronze had previously been subjected to. Having calcined about 1/2 gram of pure oxide of tin, I perceived, long before red heat set in, that the cold parts of the tube became covered with condensed water, and, having heated the metal as if it were for an ordinary analysis, I found the tin completely reduced to little bright drops. The same experiment yielded repeatedly an identical result. From this it would appear that Künzel's opinion is incorrect, and that the quantity of water emitted from pure tin bronze really represents the whole of the oxygen contained therein. Nay, that bronze might contain small quantities of lead, antimony, arsenic or iron without the accuracy of the quantitative analysis being affected thereby.

On the other hand it is doubtful whether the oxygen found in manganese bronze is all the oxygen contained in it. We have already said that protoxide of manganese is not reduced by hydrogen. By analysis we are only enabled to infer that the oxide of copper, the oxide of tin, and generally all reducible oxides, have in a great measure been destroyed.

We cannot determine whether the oxygen was completely eliminated or whether it remained behind, combined with manganese. But, even if the latter be the case, the favorable action of manganese is sufficiently explained by the circumstances that, on account of the difficulty with which it is reduced, the protoxide of manganese is not able to exercise an oxidizing action upon sulphides present, and thus to bring about an escape of gas. Taking into account the proportion of manganese that enters into the composition of this kind of bronze, viz., 0.30 per cent., and the proportion shown by analysis, viz., 0.14 per cent., it seems probable that part of the oxide of manganese formed at the expense of the oxides of copper, tin, &c., has really been eliminated. In just the same way the small quantity of phosphorus that exists in phosphor-bronze, by the side of an extremely reduced proportion of oxygen, goes to show that the phosphoric acid originally produced by the reduction of the oxides has been eliminated from the alloy.

The following are the returns yielded by the analysis of brass: Berlin brass in bars, 0.033 per cent.; Vienna brass in bars for rolling, 0.015 per cent. of oxygen. In

these two specimens the percentage of oxygen is small and very much below that of copper or of bronze unmixed with manganese or phosphorus. No doubt zinc is the metal which in its compounds plays the part of a reducer similar to that played by manganese or phosphorus in bronze. To find out whether oxide of zinc can remain in a state of solution in brass without being decomposed by hydrogen, I determined on subjecting pure oxide of zinc to the same experimental conditions as oxide of tin in a current of hydrogen. It is true that a reduction to metallic zinc took place, and that the latter was volatilized, but it did so very slowly, as H. Sainte-Claire Deville observed heretofore. On the other hand, I did not succeed in isolating oxide of zinc by a wet process. Therefore it does not seem impossible that the proportion of oxygen as yielded by the analysis of brass may be but a fraction of the one actually in existence; but oxide of zinc, the same as oxide of manganese, would be fraught with fewer drawbacks in these alloys than oxides that are more easily reducible.

I remarked in the foregoing that no sulphureted hydrogen is set free by heating in a current of hydrogen in the case of zinc alloys containing sulphur. From this it may be inferred that sulphur, on its own part, is present in a form less favorable to the evolution of gas. The cause we have seen leading to the evolution of gas in casting ordinary bronze, and especially copper, do not operate with alloys of zinc, and thus brass is more readily obtained in solid castings. The honeycombs in blocks of brass, especially such as contain a good deal of zinc, do not arise from gas being set free; this may be shown by examining the sides of such castings. They simply spring into existence by the fact that the metal contracts in passing from a liquid to a solid state. Bronze containing zinc, the same as brass, is less liable than pure tin bronze to be interspersed with honeycombs produced by the escape of gas. The fact of zinc being easily oxidized accounts for the favorable results obtained by adding small quantities of this metal to other metals. As regards nickel and its alloys, they also give rise to phenomena that may be interpreted by means of the identical principles. The results of the analyses are as follows: Nickel and nickel bronze; nickel in casting ingots, proceeding from Pfannenstiel, brittle, not malleable, 0.304 per cent. of oxygen; nickel from ditto, obtained without addition of magnesium, rolled and crimped, 0.084 per cent.; sheet nickel, produced by the Fleitmann process at Isenlohn, malleable, 0.095 per cent.; cast nickel bronze, 0.061 per cent. of oxygen. This brittle nickel contains proportionately three times as much oxygen as malleable nickel. The hardness of certain descriptions of nickel has often been attributed to the carbonic oxide they contain; this gas escapes when the molten metal is poured out, and honeycombs are the consequence. The action of the Fleitmann addition of magnesium is often explained by stating that it destroys this oxide of carbon, and thus turns brittle and hard nickel into malleable nickel.

This explanation has never satisfied me. I can well understand that gas dissolved in a molten metal, upon being set free when the metal solidifies, should leave it full of holes, and on that account unsuited for certain purposes; but it is quite another thing to prove that the intrinsic properties of the metal, such as its tenacity or its malleability, are notably affected by such gas bubbles, for, after all, these bubbles represent nothing but cavities that destroy the homogeneity of the metal, but can have no bearing on its specific properties. No inquiry has ever been made into the question whether carbonic oxide can remain bound up with the chilled metal in such proportions as to be able to alter its properties; as far as I am concerned, I look upon this hypothesis as highly improbable. The fact of carbonic oxide gas being set free, which is chiefly the case in brittle nickel, appears much less as the cause of the hardness of metal than it does as one of the phenomena of the true underlying cause. It is generally known that every foreign body, carbon especially, brings down the malleability of metallic nickel. Therefore nickel obtained by reduction with coal contains always carbon, of which the refining process relieves it in part. The question now arises, Is it possible to eliminate this carbon entirely by blowing air into it? It does not seem at all probable, taking the case of air as a precedent, for it is well known that by treating pig iron with a constant current of air, as is done in the Thomas process, the iron is not freed from the whole of its carbon. The smaller the proportion of this metalloid in the metallic mass the more difficult it is to get rid of it. In the case of nickel, which is fusible only at a very high temperature, the refining process requires very oxidizing flames; therefore the metal may absorb a great deal of oxygen which remains fixed therein after it has grown cold, and which alters its properties. If the proportion of oxygen goes beyond a certain limit the malleability of the metal is reduced. Now, if oxygen meets with carbon in the metallic bath, a continuous formation of carbonic oxide takes place, which carbonic oxide seems soluble in the molten metal, and being set free, especially at the moment when the metal becomes solid, produces honeycombs therein.

The smaller the proportion of carbon in the bath the more oxygen may be dissolved therein without an immediate reaction taking place between the two elements, so that in proportion as the one decreases the other, whose presence becomes apparent by such great drawbacks, increases. The metal does not become malleable until after the excess of oxygen that is necessary for destroying the carbon has disappeared. This object is achieved by adding to the bath a body which, in combining with oxygen, forms a scoria with it which is insoluble in the molten metal. According to Fleitmann, magnesium is used for that purpose; and good results have also been obtained from the use of manganese or phosphorus. A small addition of zinc may also produce a favorable effect on the malleability of nickel. Nickel with zinc superadded to it could only contain a notable proportion of oxygen in the improbable case of the solubility of oxide of zinc in the molten metal being perceptible. The decarburization of nickel is not pre-

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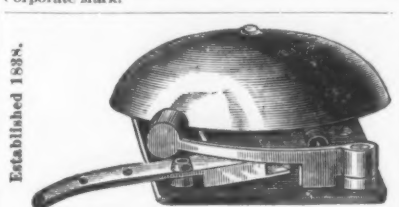
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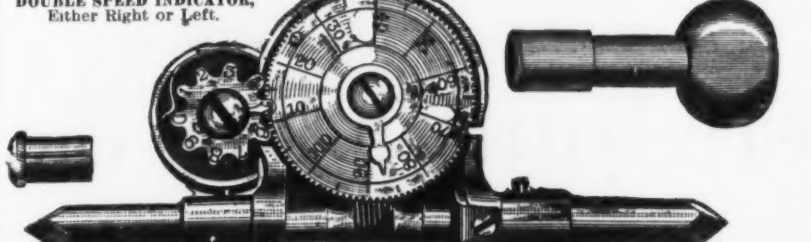
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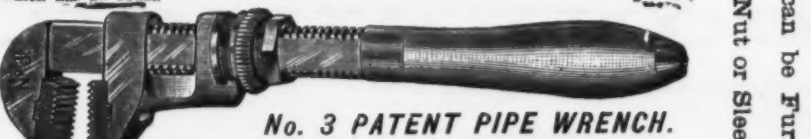
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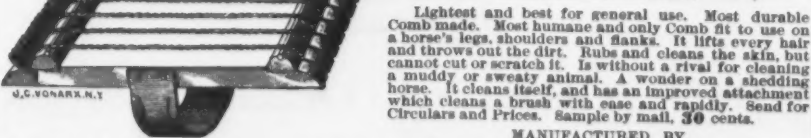
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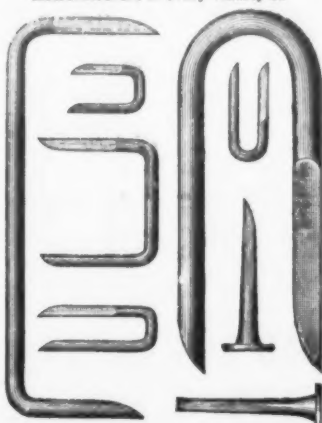
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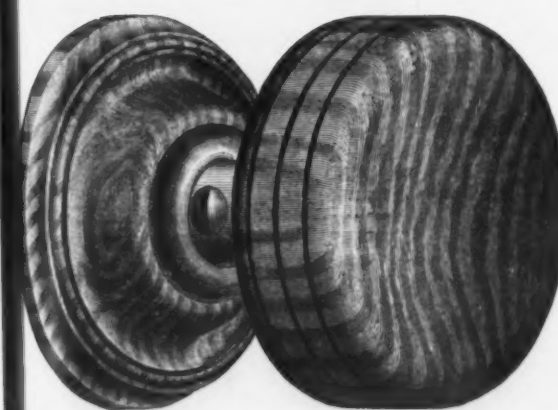
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LONDON, DECEMBER 28, 1885.

THE HOLIDAYS

are now in full swing, and business is at a decided discount. The holidays began on Thursday afternoon last, and there will be more or less commercial laxity up to the end of the year, which is now so near at hand that we may be considered to have done with 1885. A good many persons will experience a welcome relief when they have turned their backs upon what has been a twelvemonth of almost unmitigated worry and anxiety, and I do not think anybody but the most sanguine could possibly regret the termination of the period. Having got rid of 1885, however, there is a good deal of discussion as to whether 1886 is likely to be more beneficial to us. For some years past we have been accustomed to hope that the new year would bring a better state of affairs, and on each recent occasion we have been disappointed. "Hope springs eternal in the human breast," nevertheless, and we are about to enter upon 1886 with hopes and expectations of a very sanguine character. There is an almost universal consensus of opinion that the conditions favor an early and possibly a considerable improvement. Stocks are known to be light of almost all leading commodities, the production has been decreased by the long continuance of unprofitable prices, and the present rates are believed to be so absolutely minimized as to leave no hope of any further declension. All these are favorable signs and they are being read in that light by the majority of traders. That reading, however, is very greatly helped by the news from the United States, whence almost all the current reports are so favorable that high expectations are being formed as to the "boom" you are likely to have in the spring. Personally I fancy there is a little "high falutin'" about some of the American reports, and if I were an iron manufacturer I should not build too much upon the American foundation, yet the thing is as I have stated and it will require a good show of hard facts to destroy the faith of those who look so confidently to the United States to lead anew the van of progress. Less sanguine persons are not quite so certain that we are to have a spurt. They point to the enormous stocks of pig iron in reserve in Scotland, Cleveland, &c., and hold that the consumptive requirements of the world are still much below the productive power of the world. They hold that we have not yet reached the bottom of the valley of depression, but must plod along until by severer weeding out than has yet taken place the balance is again restored. This is not a very cheerful view, but it is cold common sense, and is, I fancy, more likely to prove right than excessive optimism.

THE IRON MARKET

is as quiet as usual at this season of the year, and new engagements are not likely to affect the operations of the next week or two. At Glasgow the market has been flat and quiet, with rather lower values for warrants, which closed at 41/3 ton. There was no market at Glasgow on Thursday afternoon, December 24, or on Christmas Day, and there will be no market from the forenoon of Thursday, December 31, until Tuesday, January 5. The issue of the annual statistics of the Scotch pig-iron trade for 1885 was awaited with some curiosity, especially as to the total stocks. The shipments have decreased 90,000 tons, which is about the amount by which the importations of Middlesboro' into Scotland have increased this year. Scotch makers' brands are quiet and a trifle easier. At Middlesboro' the market is very dull, and No. 3 foundry pig is freely offered at 32/3 ton. The outlook is not very bright, and values will not improve save under the stimulus of a greatly restricted production, on which subject the smelters do not appear to have made up their minds as yet. West Coast hematite ores and pigs are very steady, mixed lots of the latter being firm at 45/ @ 45/6 ton, although warrants are to be had at 44/, or even a little less than that price. The shipments from the West Coast ports to date this year have been: Pig iron, 476,964 tons, and steel rails 264,836, the former being a decrease of 79,034 tons and the latter of 7479 tons this year. In the West Cumberland stores the stock of pig iron is now 99,039 tons, an increase of 35,141 tons during 1885. The furnaces in blast number 40, as against 49 this date last year. In the other smelting districts crude irons are quiet and stocks are considerable, although not nearly so heavy as those just mentioned. Numerous inquiries are about for next year's supplies, and in some cases the negotiations have ended in contracts for fair-sized lots at about present rates; yet many of the ironmasters are not over-anxious to sell far forward, except at a small advance. In heavy manufactured iron a moderate turnover is being effected in several directions, but the order books are becoming bare and the outlook is not of the best. In fencing wire a little new business is being done, but much of it falls to the share of the German makers, who still underquote our own producers. Galvanized sheets are moving off freely, but values are no better and not more regular than they have been any time these last four or five months. Ordinary sorts of merchant iron are in tolerable request only, the demand continuing to run largely on common and medium sorts of bars, &c. Belgian competition for export orders is formidable at £3. 15/ @ £4 1/3 ton, but some business is being done for India in common Welsh at £4. 7/6 @ £4. 10/, and ordinary bars in general are obtainable at all sorts of quotations down to £4. 15/ @ £3 ton. Fred. Pitts & Co., London, quote:

Old double-headed iron rails... £. s. d. 2. 13 0 @ 2 15 0
No. 1 heavy wrought scrap... 2 2 0 @ 2 5 0

Old iron boiler tubes... 2 0 0 @ 2 5 0
Old leaf-spring steel... 2 12 6 @ 2 17 6
Old cast iron... 1 18 6 @ 2 0 0
Old flange rails... 2 11 0 @ 2 12 6
Free on board London or other good English port.

Business in old material is better and prices firmer, and it would not be easy to buy except at the higher prices mentioned. Old rails are firmly held by the railway companies, and scrap is steady.

Freights are unaltered for the most part, pig iron by ordinary steamers from Glasgow to New York being steady at 7/6 @ 10/ ton. The complaints as to the operations of the shipping "rings" continue, and show that these combinations are having most mischievous effects. Not only are outward goods being taken from the Continental ports to Australia, China, &c., at lower rates than from London or Liverpool, but freights from the East to America and the Continent are being similarly prejudiced, an instance being furnished in which 30/ was charged from China to New York, and 60/ from China to London. Steel is quiet in all branches at Sheffield, but the Bessemer and Siemens concerns are doing a moderate turnover. Old railway leaf-spring steel is steady at about 52/6 ton, c.i.f. New York. Crop ends are scarce and dearer at 52/6 @ 55/ ton for export, and 70/ @ 75/ for sawn ends suitable for the use of home rolling mills. Steel rails are in slightly better request, but the nominal prices of the association remain as before, namely £4. 15/ for D. H., and £4. 17/6 for flange.

SCOTCH PIG IRON

is very quiet, the annual statistics having taken the steam out of many of the speculators for the rise. It had been anticipated that the stocks would reach between 900,000 and 1,000,000 tons, but nobody thought that the latter total would be largely exceeded. It is now seen that the "official returns" made last year were largely fallacious, and that the estimates made, in the absence of the returns which were withheld by some of the ironmasters, were much below the mark. The present figures will doubtless keep values down, especially as it is seen that with an average of five furnaces less in blast than in 1884 the make has been 15,000 tons more. The official returns are:

	1885.	1884.
Make of pig iron, including hematite, from Christmas, 1884, to Christmas, 1885...	1,003,562	988,000
Average number of furnaces in blast during that period...	89.94	95
Stock of pig iron, including hematite, at Christmas, 1885...	384,995	241,577
Number of furnaces in blast...	91	93
Stock in Connal's store...	665,998	519,423
Stock in makers' yards...	384,995	241,577
Total...	1,050,993	821,000

There are now 92 furnaces in blast, as against 93 a year ago. Shipments have been 130,785 tons, a decrease of 89,329 tons, while the importations of Middlesboro' pig iron have been 368,607 tons, an increase of 91,095 tons. Warrants stand at 41/7, against 42/6 same date of 1884. Current prices are as under—perhaps 6d. less:

Deliverable alongside.	No. 1	No. 3
Gartsherrie, at Glasgow...	46/	43/6
Coltness, " "	50/	46/
Langloan, " "	47/	44/6
Summerlee, " "	51/	45/
Calder, " "	51/	48/6
Carnbroe, " "	45/	42/6
Clyde, " "	46/	42/
Monkland, " "	42/6	40/
Quarter, " "	43/	39/6
Govan, at Broomielaw...	42/6	40/
Shotts, at Leith...	47/	40/6
Carron, at Grangemouth...	51/	47/
Kinnell, at Bo'ness...	43/6	40/
Glengarnock, at Ardrossan...	46/6	42/6
Eglinton, " "	42/6	39/
Dalmellington, " "	41/6	40/6

MIDDLESBORO' PIG IRON

is dull and easy, partly under the influence of Glasgow and partly because the annual statistics are expected to compare badly. Current prices are:

No. 1 Foundry...	34/0	Mottled...	30/9
" 2 " "	33/9	White...	30/3
" 3 " "	32/6	Refined metal...	30/
" 4 " "	31/9	Kentledge...	35/6
" 4 Forge...	31/3	Cinder...	30/

HEMATITE PIG IRON

is steady at about 44/6 @ 45/ for mixed numbers in usual proportions, the market being supported by the statement that over 100,000 tons of these pigs have been sold for delivery in the United States over 1886. Stocks in store are 100,000 tons. Shipments, 476,964 tons, a decrease of 79,034 tons. Furnaces at work, 40, against 49 a year ago. Current quotations:

	No. 1.	No. 2.	No. 3.
Cleator...	45/6	45/3	45/
Lonsdale...	45/6	45/	44/6
West Cumberland...	45/0	45/	44/6
Lowther...	45/6	45/	44/6
Distington...	45/	44/6	44/
Harrington...	45/6	45/	44/6
Solway...	45/	44/6	44/
Maryport...	45/6	45/	44/6

TIN PLATES.

In London this market is without any change on the week, but in some quarters a little steadier tone is reported, though orders are not by any means numerous. Best charcoal plates are in specially good request, but cokes on the other hand are dull. I quote as last week good ordinary IC cokes 14/ @ 14/6, f.o.b. Liverpool. At Liverpool, though there is not a very marked increase in the demand for tin plates, a considerable amount of business has been got through since my last report was written. Prices having been got down to a point low enough to tempt some of the buyers, many orders were immediately placed. The general action of buyers in holding off the market for a considerable time had the desired effect, and coke tins became easily obtainable at 14/ IC; Bessemer steel with coke finish at 14/3 IC, and Siemens steel plates with coke finish at 14/9 IC. A great deal of buying took place at these figures, and this for the time seems to have satisfied sellers, as they do not press their plates on the market as they did last week. The bulk of the demand this week has been for the above-named sorts of plates, and there is no change in prices so far, excepting for some ordinary kinds of Bessemer steels, which are now said to be offered at 14/. This also continues to be the figure at which good brands of coke tins are still to be had. The demand for charcoal tin plates as well asterne plates is but small, and not many orders of importance have been received lately. Coke tin wasters are in fair demand at 13/, and

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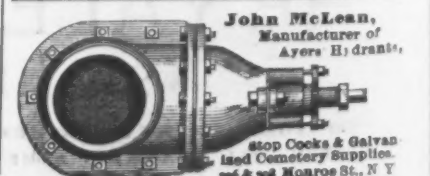
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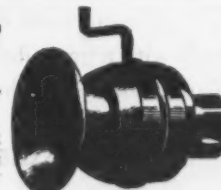
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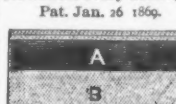
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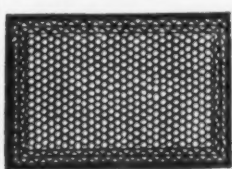
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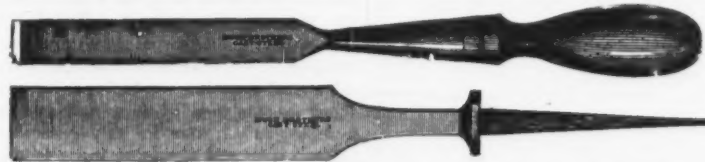
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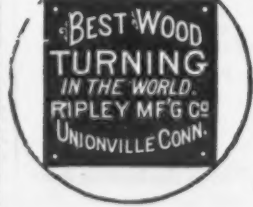
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THE HARDWARE TRADES.

In London and the home counties business
may certainly be described as flat, and as re-
gards the export trade a not much better re-
port can be made. Many firms have found
business so bad of late, and withal so very
unprofitable, that they have been compelled
to recall their travelers a fortnight or three
weeks earlier than usual. A significant in-
dication of the condition of business and the
straits to which competition has brought cer-
tain branches of the trade is the fact that
some firms in London have worked the
whole of Christmas-tide, so that their trav-
elers may start off by New Year's day,
at least with the new samples for the spring
and summer seasons. At Birmingham there
seems to be a general feeling of relief in local
commercial circles that 1885 has come to an
end, for it was long past mending in a com-
mercial sense, and every one was anxious
to wind it up as quickly as possible and
begin a new chapter. Whether 1886 will
prove more prosperous remains to be seen.
With the exception of the local ammunition
branch, which is supported by large home
and foreign military contracts, and the mil-
itary-rifle branch, none of the local work-
shops or factories have made full time this
week. At Wolverhampton the factories
and workshops were very busy up to
December 24. Manufacturers, where orders
have not been in hand to warrant full
time, have let the men work in part for
stock. The amount of unexecuted work
which will be left upon the books for the
opening operations of the new year is not
large. Merchants state that the East Indian
and South American business is still much
depressed by the existing low rates of ex-
change, and that Australian business con-
tinues to be militated against by the pre-
valence of the consignment system, which
keeps the markets overstocked and brings
down prices. At Sheffield home orders have
tapered off a good deal, and a large propor-
tion of the work turned out will go into
stock. The year closes as it began
and continued through spring, summer
and autumn alike—badly. One feature
which has marked the American trade of the
last few years has been the tendency to
obliterate what used to be the strongly-
marked periods of business. The "spring"
and "fall" orders are still sufficiently pe-
riodical to preserve the lines upon which
Western trade has so long run, but develop-
ment of the means of regular communication
and transport in the States has diffused the
trade over the entire year to a much larger
extent than has hitherto been the case.
Whether the new year will see a recovery
in business is a point upon which local ob-
servers are content to hope rather than to
prophecy. Manufacturers have grown weary
of construing probabilities, and it is perhaps
wiser, after all, to expect nothing, with the
chance of being surprised by fortune, than
to build up hopes which may be destined to
disappointment. The export trade gener-
ally continues to be inactive, and there is no
probability that so far as the iron and steel
branches are concerned the closing month
of the year will prove an exception to the
eleven that have preceded it.

The Crell Experiments.

Referring to the experiments on the elec-
trical transmission of power between Crell
and Paris, concerning which so much has
already been said, *Engineering* of recent
date remarks:

The members of the Academy of Sciences
have been invited to assist in the experi-
ments, and a recent visit paid by them was
marked by some curious incidents, which were
reported by M. Bertrand at the meeting of the
Academy held on December 14. We have
already pointed out that the cable conductor
would probably act as a condenser, of which
one element would be the cable itself, and
the other the lead sheathing which in the
Berthoud-Borel system forms the external
surface of the insulation. Under the high
tension of the current transmitted the
phenomenon of condensation was produced,
and the discharge was assisted by the ex-
cessive humidity of the atmosphere during
the trials. The conductor, at certain points
of its course, passes quite near to various
telegraph lines. At one point a contact was
established accidentally, the branch of a
tree shaken by the wind making the con-
nection; the discharge was assisted by the
moisture covering the branch, and it trav-
ersed the wire as far as the nearest tele-
graph station, where it discharged itself in
a powerful spark and damaged the appar-
atus. From the same cause the telephone
and telegraph instruments at the different
forts on the north side of Paris were thrown
out of order.

In another place, where the conductors
passed over a house, a series of sparks were
produced to the terror of the people residing
in the building. Of course these phenomena
were not surprising, and present no argu-
ment against the experiment. They simply
prove that the type of insulation chosen by
the commission, and which is well adapted
for less powerful currents, is not so suitable
in this case. In the earliest stages of the
undertaking this question of insulation was
approached with great hesitation on the part
of the commission. An efficient rubber
coating was rejected on account of its high
cost, and the Berthoud-Borel system was de-
cided upon without any idea being enter-
tained of the curious results that would fol-
low, and which would have been avoided if
a simple insulation of tarred cotton had
been employed. This would also have had
the advantage of cheapness and reduced
weight. But as the line is complete, and
must be maintained as it is, the inconven-
iences already experienced will be avoided
by making earth connections at each post, so
that the electricity condensed on the surface
will pass off readily. The recent trials have
also shown the necessity of improving the
insulation of the dynamo, and the wisdom
of sparing no expense in material and work-
manship to insure durability, which is, of
course, one of the first conditions of com-
mercial success. The cost of first establish-
ment will be raised considerably, but that is

a small matter compared with the frequent
breakdowns, stoppages and repairs that
would follow anything but a first-class in-
stallation. Up to the present the experi-
ments have not gone beyond their prelimi-
nary phase, and have given only very ap-
proximate results.

**The Puddling Capacity of Great
Britain.**

The *Iron and Coal Trades Review* has is-
sued an almanac for 1886, in which is pub-
lished a list of the firms in the United King-
dom manufacturing finished iron, the name
of the works owned by each firm and the
number of puddling furnaces at work and
idle. It is a long time since such a return
has been drawn up in detail, and great
changes have taken place during the last 10
years. It has been repeatedly asserted—
and, indeed, the statistics bear this out—
that the finished-iron industry is waning,
owing to the steady advance of steel. It is
only within the last five years that statistics
of production have been collected, and these
show that in 1881 the output was 2,681,150
tons; in 1882, 2,841,531 tons; in 1883,
2,730,504 tons, and in 1884, 2,237,535 tons;
so that the trade yet remains a most im-
portant one; and if, as is predicted by com-
petent authorities, the days of puddling are
numbered, it seems as if the number of days
would still be large, for it is only in two or
three branches that steel has superseded
iron. A list of the puddling furnaces should,
therefore, be quite as useful as one of blast
furnaces. The summary of the list from the
almanac is as follows:

England and Wales.			
Name and situation of works.	At work.	Idle.	
Cheshire,	22	6	
Cumberland,	11	27	
Derbyshire,	30	20	
Durham,	47	41	
Glamorganshire,	195	100	
Lancashire,	321	61	
Monmouthshire,	70	71	
Nottinghamshire,	14	4	
Shropshire,	154	4	
Somersetshire,	18	0	
Staffordshire, North,	353	75	
Staffordshire, South,	1,315	284	
Worcestershire,	156	32	
Yorkshire, Cleveland,	300	102	
Yorkshire, West Riding,	382	102	
Scotland.			
Lanarkshire,	294	117	
Totals in Great Britain,			
	4,059	1,581	

Twenty years ago 6407 furnaces were at
work; in 1872—the briskest period the mal-
leable-iron trade has ever known—there
were 7311, and in 1875 7575, the largest
number ever reported. Since that year the
number working has rapidly fallen off, and
this year only 4059 are returned as working
and 1581 as idle. The number of establish-
ments engaged in the manufacture of puddled
iron was 332 in 1878, against only about 250
at present.

Otto vs. Steel.—The important case of
Otto vs. Steel, which has been fought for 16
days before Mr. Justice Pearson in the Chan-
cery division of the High Court of Justice,
London, England, ended on December 19,
with judgment for the plaintiff. There was
a formidable array of counsel and scientific
witnesses for the prosecution, consisting of
five lawyers and three scientific witnesses,
and the other side was also ably represented.
The point at issue was the validity of Dr.
Otto's patent of 1876, which was strongly
contended for already in Otto vs. Linford
some years ago—then decided in favor of
the well-known inventor. The defendant
admitted that his engine was an infringement
of the Otto patent, and if it were valid
he was liable under the statute. The de-
fendant sought to invalidate the first claim
on particulars of objections not dealt with
in the former case—Otto vs. Linford. From
the plain evidence furnished by the sci-
entific witnesses the judge decided that the
first claim is strictly accurate, according to
Dr. Otto's specification. He also concluded
that the mixture when fired is as specified
by Dr. Otto, and has exactly the effect
which he describes in his first claim; that
his invention has not been anticipated by
any of the specifications which have been
put in before him, and that therefore Dr.
Otto's patent is a valid and good patent.
The defendant was given one month within
which his engines should be given up. A
petition for having the injunction suspended
for a longer term was refused on the
ground that this action was the second in
which the court had declared in favor of the
patent.

Rapid Bessemer Work.—The Scranton
Steel Co., of Scranton, Pa., report the fol-
lowing figures as the result of their December
work:

Number of 12-hour turns worked,	25.00
Number of heats made,	1,331.00
Total tonnage (gross),	7,230.00
Average tonnage per turn (gross),	288.80
Average number of heats per turn,	52.24
Average tonnage per heat (gross),	4.43

It will be noted that the average tonnage
per heat was low, only 4.43 tons, due to the
comparatively small capacity of the convert-
ers, and yet working night turn the plant,
by extremely rapid work, produced a quan-
tity of ingots which a much larger vessel
plant might find it hard to rival. An aver-
age of 65.24 heats per turn for a whole
month at a time is, we believe, unparalleled
in the history of Bessemer steel manufacture.

One of the local correspondents of the
Engineer writes: "Competition in the steel
trade continues severe. Steel sheets for
shovel-making have just been imported into
this district from German steel works at
about £7 per ton, notwithstanding that there
is a carriage upon the steel of 26/ per ton.
German steel-plate bars for the edge-tool-
makers can be delivered here at less than
£5. 7/6 per ton. What do the Welsh steel-
masters say to this?"

Charles H. Scott, of Escanabo, county
clerk of Delta County, Mich., is seeking
the addresses of idle furnace companies,
rolling mills or car-wheel manufacturers
who might desire to change their location.

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AND

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Commercial Prospects in Asia.

The movements of England in Upper Burma, evidently with an eye to commercial advantage in China, are interesting. The policy of China, it is clearly seen, can no longer be repellent and exclusive, but must take a new departure in the direction of industrial and defensive enterprise, looking to England as a natural ally in the path of progress. The latter, on her part, disclaims all desire for further territorial extension, her policy now being simply one of commercial expansion and development. The ignoble collapse of French designs in Tonquin, the annexation of Upper Burma to the Indian Empire, and the rest less ambition of Russia, are circumstances which British diplomacy is quick to discern in their relations one to another. British influence in Burma being now paramount and undisputed, the first impulse is to make friendly overtures to her Asiatic neighbor, impelled by a common interest. An impenetrable barrier must be erected, it is urged, against Russian encroachment. To this end it is of immediate strategic importance that China be induced to carry her proposed line of telegraph from Peking to Europe through Mandalay, the Burmese capital, rather than, as previously contemplated, through Russian territory. British manufacturers have their eyes turned to the 350,000,000 inhabitants of the celestial dominions, and statisticians are figuring the yards of cotton, the tons of rails and the number of locomotives which such a multitude of people ought to buy. No wonder Englishmen are elated by the glowing commercial prospects opened through the defeat of King Thebaw. Addressing the London Society of Arts, one of its members recently said: "We can now drive the iron horse from India down the Valley of the Irrawaddy and via Maulmain, to the very gates of China, without any impediment."

One fact should not be forgotten in discussing this subject. Although the population of China is enormous, the *per capita* consumption is low, so that it will not do to be misled in this way. The introduction of European civilization will do much also to develop the enormous dormant resources of the Empire, and this will notably be the case in the mining and metallurgical industries. At the present moment interest centers in the prospective building of railroads in China. It is a striking fact that the principal object of the movements made in Europe are directed toward providing a new outlet to the iron and steel producers of the leading countries interested. We have in the past alluded to the steps taken by parties in

this country who are trying to secure contracts for the building of railroads in China. In England Baring Bros. and the Hong Kong and Shanghai Banking Corporation are named as being the leaders. In Germany Krupp is the one credited with aspirations in the same direction—an impression that appears to have grown out of the fact that he has sent an engineer to that country. In reality the prime movers are an association of Westphalian and Rhenish ironmasters, backed by Berlin banks. Recent cable advices state that negotiations are in progress through the latter for a loan of no less than \$175,000,000. German promoters seem very hopeful in this matter, and point to the fact that they are building ironclads for China. But the leading spirit in the effort to introduce Occidental methods of transportation is Li-Pong Pao, formerly ambassador to Germany, and the chances of Germany are better because she has never had any embarrassing complications with China, as England and the United States have had and still have. The institution named as having taken the initiative is the Deutsche Bank of Berlin, and it is added that an effort by a rival syndicate to struggle for the same privileges was abandoned when it was ascertained how far negotiations had progressed.

As yet the entire matter may be said to be still in an embryo stage. It is beset by difficulties which are naturally of a peculiar character, growing as they do out of prejudices among the Celestials which to us seem light, but in reality are very serious in their character. The chief opposition to the building of railroads comes from the clerical party, and is said to grow out of the fact that there are no cemeteries in China. The priest indicates where the deceased Chinaman is to be buried, and that locality is held sacred ever afterward. It would be practically impossible in building a railroad to dodge the innumerable graves, and hence the violent opposition of all true believers. How far this is merely a pretext of the very influential conservative party in China, it is, of course, impossible to say. It is certain, however, that innumerable and annoying stumbling blocks will be placed in the way of those who become identified with the undertaking.

So far as American industries are concerned, those which are producers of the cruder and bulkier materials will have little chance for additional work. We may and probably will receive orders for special machinery, in the excellence of which others cannot compete with us. If the undertaking is conducted by European capitalists this will be narrowed down to its smallest limit. If American promoters take hold of it, they will naturally turn with greater confidence to home makers. Beyond that it is hardly worth while to look for the present.

The Treachery of Steel Plates.

One of the most sensational accounts of the treachery of steel plates used in boilers has been brought to the notice of the engineering world through the columns of the *Engineer*, by Mr. Arthur J. Maginnis. There have been a good many instances of so called mysterious failures of steel plates and other shapes, but they have either occurred when the material was at rest or had just been put into service after being manipulated. In the majority of cases the failure was easily traced to improper methods of working the steel, neglecting some of the precautions thoroughly well understood now by those who have any experience with the homogeneous material. The only startling thing about the collapses so repeatedly announced is that, unlike iron, steel does not at once betray the effect of wrong treatment. Very frequently hours and days elapse before fracture occurs, and then apparently without the slightest provocation. It is this that has rendered failures so startling, that has so often frightened consumers and puzzled producers. Mr. Maginnis's case is one which is far more serious, because it creates uncertainty where formerly perfect confidence was felt. The loss encountered and the harm done by cracking of steel plates during the process of manipulation, or even after it has become a part of the finished structure, is serious enough. But it becomes a matter for great alarm when material apparently does excellent service for years and then suddenly develops weakness. We cannot undertake to describe in detail the remarkable case which Mr. Maginnis presents. Suffice it to say that six steel boilers, put into two different vessels, were in use for two and a half years. One of them, three weeks after the boilers had been blown down, cracked spontaneously while scaling was going on. Another plate in the combustion chamber of a second boiler cracked with a loud report 13 days after steam had been let down. In taking down the boilers the weakness of the material was such that they were practically wrecks, the plates breaking in innumerable places.

The steel was fairly good. Before the plates left the makers' works they were tested, and 40 tests given in detail show a range of tensile strength from 58,333 pounds to 68,095 pounds, and an elongation in 10 inches varying from 20 to 28 per cent. The chemical analysis reveals nothing whatever to account for the failure, the following being the composition of three cracked plates:

	1	2	3
Carbon.....	0.125	0.175	0.125
Silicon.....	0.005	0.018	0.018
Manganese.....	0.320	0.370	0.530
Sulphur.....	0.051	0.045	0.048
Phosphorus.....	0.060	0.066	0.061

In its comments on the matter the *Engineer* conveyed the impression that the material was basic steel. This later correspondence showed to be an error, as it was acid Bessemer steel made by the Weardale Iron and Coal Co. That the plates were considered perfectly safe at the time they were put into the boilers is shown by the fact they passed all the tests, severe as they are, of the Board of Trade and of Lloyd's, and that according to Mr. Maginnis the steel stood without the slightest defect the ordinary work of the boiler shop, including welding. During the construction of the boilers the special instructions of the Board of Trade were followed, the holes in the shell being reamed after punching and the furnaces annealed after welding. The boilers themselves were apparently carefully handled when in service, and it should not be forgotten that they collapsed at about the same time, although they were in use in two different steamers. There was nothing in the design of the boilers, either, to cause failure, since they were of the ordinary double-ended type, with three plain welded furnaces opening into a separate chamber for the set of three at each end, and having on top of each boiler an ordinary cylindrical receiver.

Direct evidence received by tests of the steel taken from cracked plates indicates that the material must undoubtedly in some cases have undergone depreciation.

The publication of the experience of Mr. Maginnis at once brought out a number of correspondents. None of them have offered any explanation of the problem worthy of being recorded. The opinion expressed by one of them is rather discouraging to steel-makers. He holds that the very homogeneity of steel is its greatest source of danger, because it fails to offer any resistance when the material is under stress to the extension of minute incipient cracks till destruction has followed. He insists that so long as steel is a homogeneous material it will remain treacherous. That the sufferers from the failure spoken of do not think so is evidenced by the fact that under advice from their builders and superintendent engineer they have decided to again have steel boilers put in.

The Lake Superior Iron-Ore Mines in 1885.

Through the courtesy of a gentleman prominently connected for many years with one of the leading iron mines of Lake Superior we have been placed in possession of a series of data bearing on the Lake Superior iron-ore trade. Turning first to the volume of the business as revealed by the aggregate shipments by the Marquette, Menominee, Vermilion and Agogebic districts, we have the following:

Year.	Marquette.	Menominee.	Vermilion.	Agogebic.	Totals.
1870.....	890,490	.....	.....	.....	890,490
1871.....	779,000	.....	.....	.....	779,000
1872.....	900,901	.....	.....	.....	900,901
1873.....	1,162,58	.....	.....	.....	1,162,58
1874.....	920,557	.....	.....	.....	920,557
1875.....	801,251	.....	.....	.....	801,251
1876.....	922,704	.....	.....	.....	922,704
1877.....	1,010,094	4,588	.....	.....	1,014,682
1878.....	1,023,082	78,028	.....	.....	1,101,110
1879.....	1,130,019	244,874	.....	.....	1,374,893
1880.....	1,377,499	508,255	.....	.....	1,885,754
1881.....	1,598,545	728,973	.....	.....	2,327,518
1882.....	1,829,308	1,118,184	.....	.....	2,947,492
1883.....	1,306,854	1,045,434	.....	.....	2,352,288
1884.....	1,060,250	795,674	62,000	.....	2,517,924
1885.....	1,293,799	699,640	225,484	100,568	2,418,486

The climax was reached in 1882. The last year showed a slight falling off. It must be noted, however, that the Marquette, the oldest district, lost heavily, while the Minnesota Iron Co., of the Vermilion district, in Wisconsin, jumped into a position in the first rank as an individual ore producer. The following is a list of the mines in the Marquette and Menominee districts which have shipped more than 70,000 tons in a season since 1878, the output being given in round numbers:

Mine.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.
Champion.....	73,000	94,000	112,000	145,000	150,000	105,000	210,000	197,000
Cleveland.....	132,000	131,000	213,000	199,000	296,000	218,000	236,000	217,000
Jackson.....	82,000	113,000	121,000	113,000	97,000	71,000	8,000	66,577
Lake Superior.....	109,000	174,000	204,000	292,000	297,000	291,000	206,000	212,000
Republic.....	176,000	183,000	23,000	234,000	235,000	153,000	278,000	249,000
Norway.....	.....	73,519	198,000	137,000	109,000	115,000	72,000	.....
Vulcan.....	.....	.....	87,000	85,000	94,000	80,000	102,000	124,000
Chapin.....	.....	.....	.....	135,000	248,000	296,000	291,000	177,000
Commonwealth.....	.....	.....	.....	97,000	116,000	.....	.....	.....
Perkins.....	.....	.....	.....	101,000	160,000	.....	.....	.....
Ludington.....	.....	.....	.....	.....	73,000	.....	.....	.....
Iron River.....	.....	.....	.....	.....	100,000	.....	.....	.....
Lake Angeline.....	.....	.....	.....	.....	102,000	101,000	124,000	.....
Winthrop.....	.....	.....	.....	.....	.....	89,000	109,000	.....

In 1881 and 1882 the shipments to Lake Erie ports, including Detroit and vicinity, were 1,460,545 and 1,986,282 tons respectively. In the years 1883, 1884 and 1885 the ore receipts at Lake Erie ports, including a small amount of Lake Champlain and Canada ores, were 1,692,698 tons in 1883, 1,841,877 tons in 1884, and 1,503,969 tons in 1885.

The amount of ore on docks at all the Lake Erie ports was as follows at different dates:

	Tons.
December 1, 1882.....	1,032,475
May 1, 1883.....	500,000
December 1, 1883.....	917,168
May 1, 1884.....	377,431
December 1, 1884.....	1,005,679
May 1, 1885.....	590,000
December 1, 1885.....	1,048,940

From these data it appears that the consumption during the season from May, 1883,

to May, 1884, was 1,815,247 tons; from May, 1884, to May, 1885, 1,629,328, and that for May, 1885, to May, 1886, will be 2,093,969 tons. The latter figures are based on the assumption that on May 1, 1886, there will practically be no ore on docks. This is borne out by the fact that the estimated amount of ore unsold on docks on Lake Erie ports was 410,912 tons on the 1st of December, 1883, 650,000 tons on the 1st of December, 1884, and only 130,000 tons on the 1st of December, 1885. The latter quantity has been since reduced by sales. It may be noted that the difference between the amounts reported as received at Lake Erie ports and the total amount mined in the Lake Superior districts shows the amount going to local furnaces by rail, the quantities going to Lake Michigan and Detroit and vicinity. The exactness of this amount is modified by the quantities of Canadian and Lake Champlain ores included in the receipts.

It will be observed, in studying the reports of output of the mines, that there has been a tendency toward transferring the business to larger mines. This is clearly shown by the following table of average shipments of the mines, according to the statement of the Marquette Mining Journal, since 1870, counting only the Marquette and Menominee districts:

Year.	Number of mines reported.	Average shipments per mine.
1870.....	13	68,863
1871.....	14	55,686
1872.....	19	47,416
1873.....	27	43,054
1874.....	25	36,882
1875.....	21	42,440
1876.....	22	45,126
1877.....	25	40,587
1878.....	31	35,580
1879.....	36	38,191
1880.....	44	42,894
1881.....	49	46,850
1882.....	70	42,106
1883.....	66	35,640
1884.....	57	43,096
1885.....	41	50,815

This tendency toward making the average shipments per producing mine larger in times of depression is natural. During bad years a number of furnaces must close down, either because they have not sufficient capital or because of want of ore, or because the quality of the ore is such that it will not sell at a profit during an era of low prices. Mines like the Champion, Cleveland, Jackson, Lake Superior, Republic, Vulcan, Chapin, Ludington and Lake Angeline, nine in all, have sufficient ore reserves and ample capital to continue a production of over 70,000 tons annually. The Ludington, though a new mine, having commenced shipments only in 1880, bids fair to be a constant producer. So does the Lake Angeline, which has lately found a new and large deposit of ore, thus bringing it up into the ranks of the large producers.

It has been frequently urged that the decreased cost of fuel, explosives and supplies must have so considerably reduced the cost of production of the Lake Superior iron mines that the low prices of the season of 1885 did not work so great a hardship upon the larger ones at least. The following data will go far to dispel that erroneous impression. We take as an example a typical older hard-ore mine, producing in six months about 90,000 tons of ore, and employing from 400 to 500 men in its various departments. The cost of mining in six months of 1885 as compared with an equal period in 1884 was distributed as follows, in percentages of the total cost:

	1884.	1885.
Labor.....	59.82	63.00
Fuel.....	2.72	1.53
Lumber.....	5.69	6.79
Drill steel.....	0.46	1.04
Explosives.....	10.75	10.84
Supplies.....	16.45	15.84
Miscellaneous.....	5.51	1.10
Total.....	100.00	100.00
Taxes.....	5.00	5.00

The following table gives the changes in price in some of the items entering into the cost of mining, computed on a percentage basis, between 1884 and 1885, calling 1884 100 per cent., the increase or decrease in the total quantity used, and the increase or decrease in the cost of the amount used computed on a basis of tonnage output. The plus sign (+) indicates an increase; the minus sign (—) a decrease:

Items.	Price.	Value of total quantity used.	Cost of total quantity used.
Wages.....	— 5½	— 2	+ 5.7
Lumber.....	— 3	— 28	— 28
Fuel.....	— 10	— 8	+ 18
Explosives.....	— 15	— 8	— 5
Supplies.....	— 13	— 13	— 3

In spite of the decline in the leading items the cost per ton was the same in 1885 as it was in 1884, a circumstance to which a decrease in the output of 5 per cent. partly contributed. This apparent contradiction is explained as follows, and will be promptly appreciated by those familiar with mining. The mine which furnishes

us with the figures we give is worked very economically and perhaps more systematically than any other in its district, and yet it kept its cost down to 1884 figures only because there was a marked decline in the leading items. It may be interesting to note first how heavy a percentage in the total cost is the item of labor. It increased relatively and absolutely, measured on a tonnage basis, because the ground was harder and more barren territory had to be passed through. This is clearly shown by the fact that while there was a decline in wages there was a smaller falling off in the aggregate sum paid to labor. More of it must, therefore, have been employed. Since there was an absolute increase in the cost of labor per ton of ore produced, it is evident that the quantity of work done in barren ground must have been greater. The cost of fuel is largely affected by the same considerations. Harder ore and rock mean more fuel for the air compressor plant, more work for the hoisting engines to move barren rock and unsaleable ore. Another consideration affects the fuel cost. This is greater depth. That means more water to pump from greater depth, it means additional cost for hoisting, and to some extent lessened capacity. This double influence upon the consumption of fuel is clearly revealed by the increase in cost per ton in spite of lowering of price. The consumption of explosives may in general be said to be affected nearly by the same causes as those influencing the cost of labor. The item "supplies" covers all the iron used in the shops, the duplicate parts of light machinery, steam pumps, power drills, small hoists, small castings, diamond drills and supplies and building materials, with the exception of lumber. These items are so numerous that it is impossible to generalize on the changes of prices. In the table of costs taxes have not been included because they have not yet been paid for the year 1885. Probably they will be the same as last year, or about 5 per cent. of the total cost. Another item has not been included, though it should figure in the cost sheets of every well-managed mine. We refer to royalty—or its equivalent, a charge for exhaustion of deposit. Competent judges place the minimum at 25 cents per ton, while many claim that a higher figure must be adopted.

Our data show that with the older mines of Lake Superior a decline in the cost of production without a lowering in wages is impossible; that, in fact, the falling off in the cost of many items entering into it has only had the effect of preventing a marked increase. For the coming year they do not expect to be able to produce so cheaply. Fuel at least, it is feared, will be considerably higher, independent of the probable advance in the market price of ore. That the past few years have borne heavily on the Lake mines, in spite of much that is said concerning their prosperity, is evidenced by the fact that since 1882 about 29 shipping mines have dropped out of the list. The large mines and those equipped with splendid plant are still able to produce. Besides those, those large new mines, like those in the Agogebic and Vermilion districts, can market ores at a profit because the working of their surface deposits may be accomplished at lower cost than that of the older and deeper mines. Out of the 41 mines of the Menominee and Marquette districts five are owned by furnace companies consuming their product. This leaves 36, of which only 14 are likely to distribute any returns to their owners, without, however, charging anything to royalty or depreciation account. Turning again to the question of comparative cost of marketing ore during 1884 and 1885, it must be noted that an increase of 12½ per cent. on the rates of the roads from the mines to Marquette has taken place, the result of a consolidation of rival roads. Rates on shipments by rail to Escanaba have been reduced 12½ per cent. Lake freights from Marquette to Cleveland averaged 6.3 per cent. less, while the cost of handling at Cleveland remained practically the same, or declined at most 2 to 3 per cent.

It is a somewhat difficult matter to give a fair average of prices of Lake Superior ores, because their quality is so widely different. Taking as an example a standard No. 1 hard ore, ranging from 66 to 67 per cent. in iron, non-Bessemer, containing from 0.08 to 0.15 per cent. of phosphorus, and No. 2, similar to the above, only that it is higher in silica and lower in iron, say 59 to 61, then the prices in 1883, 1884 and 1885 may be placed as follows:

	No. 1.	No. 2.
1883.....	\$6.50 @ \$6.00	\$4.50 @ \$4.25
1884.....	6.00 @ 5.00	4.25 @ 3.75
1885.....	5.00 @ 4.50	3.75 @ 4.50

No. 1 Bessemer ores carrying 66 to 68 per cent. of iron and 0.03 to 0.05 per cent. of phosphorus bring from 50 to 75 cents more than above figures, while No. 2 grade of Bessemer ore with 60 to 61 per cent. of iron is worth about \$1 less than No. 1. There are other ores which fill the gap between these qualities and prices, and then come the soft ores, going down in yield as low as 55 to 56 per cent., which during the past year sold at \$3.25 per ton, while other ores yielding somewhat more in iron, from 57 to 60 per cent. and about 0.20 to 0.40 of phosphorus, sold freely at \$3.50 per ton.

Prices have now recovered, and the prospects for the next year are very encouraging, since considerable blocks of ore have been already contracted for. Producers insist, however, that the prospective advance of 50 cents to \$1 will not go to swell the

profit on ore. It is likely that lake and railroad freights will be higher, that supplies, labor, fuel and other items will command higher prices, so that the companies will realize only a fraction of it. The lake ore producers are therefore confident of better times than those of 1884 and 1885 have been, but they strongly insist that with fair prices there is absolutely no danger that the furnaces west of the Alleghenies will suffer from a dearth of ore.

Congress and the Ironworkers.

It is evident that labor is to play a more important part in the legislation of the future than it has in the past. Its demands are being voiced through the various labor organizations, and, what is more to the point, are being listened to. Its demands have not only checked legislation that it has regarded as inimical to its interests, but it has forced upon our statute books laws that in theory and principle have been a complete reversal of the policy of our Government from its origin. Notable instances of this are the passage of the anti-Chinese and anti-contract labor bills. We are not arguing the right or policy of these bills; we are only giving them as instances of the total change in legislation at the demand of labor. It is the power and influence that labor has shown it possesses with Congress that gives its utterances regarding the tariff a significance that does not attach to the efforts of manufacturers in the same direction. Labor's views have more than once made themselves felt in tariff matters at Washington. When Mr. Wood had prepared his tariff bill some years ago, committees of manufacturers sought in vain to be heard before the Ways and Means Committee until the workmen in no uncertain tones demanded a hearing for them, in the interest of both workman and employer. Argument may not have much effect upon him, but the political power of large bodies of organized workmen cannot be ignored by the politician.

It is evident that the workmen propose to take an active part in any discussion over the tariff that may be had at Washington this winter. What will be the position of the ironworkers is evident from the following resolutions concerning the tariff, which in substance have been adopted by them in several places:

- Resolved, That we heartily condemn as workmen all efforts to revise the tariff by a reduction of the duty upon any imported article that comes in competition with home productions, as such reduction would be in favor of foreign produce and against home labor and capital.
- Resolved, That if Congress revise the tariff that we demand said revision to be in line of protection and encouragement to the establishment of industries, and adding life and energy to those which are now in a languishing condition. We would recommend the following changes:
1. A duty of \$10 per ton on pig iron and spiegel-essen.
 2. A duty of \$12 per ton on old rails and scrap of all kinds of iron and steel.
 3. A specific duty of 1 1/2 cents per pound on cotton ties.
 4. A specific duty on wire rods of 1 cent per pound.
 5. A restoration of the duties on bar iron previous to 1883, viz., 1-1/2 cents, 1-3/4 cents and 1-5/8 cents per pound. The same on sheet iron.
 6. A specific duty of 2 1/2 cents per pound on tin plates, tinned plates, taggers and taggers' tin.
 7. That in all cases where applicable specific duties take the place of ad valorem duties.

The Youngstown, Ohio, ironworkers make a demand, in addition to these, that the duties on coal and ore remain as at present. There are two things to be noted in connection with these demands. The first is that these workmen, who are chiefly, if not entirely, mill men, demand the retention of the present duties on coal and ore—that is, on the raw materials of their industries. They go further and ask that the duties be increased on pig iron, spiegel-essen and cast scrap, which are one remove from the coal and ore, but are still raw material. In this they are consistent. While they demand protection for themselves, they are willing that others should have it, and will assist them in getting it. The second point to be noted is that this demand covers most, if not all, of the iron articles the rates of duty upon which have been the subject of discussion for some years. The only one that we now recall that is not included is steel blooms. The duties on cotton ties, wire rods, tin plates and scrap iron—or perhaps it would be better to say that the decisions of the Treasury Department as to the duties on these articles—have not been at all satisfactory to the ironworkers. The Treasury decisions were enacted into law in the last tariff, and have in the main continued the conditions that existed. Though we are the largest consumers of tin plates, none are made here; though most, if not all, the cotton ties are used in this country, but few are made, and none will be if times and prices improve. We are the largest consumers of wire rods, and yet we imported over 200,000 tons in the year ending June 30, 1884. The duties on wrought scrap iron have long been a subject of complaint on the part of the ironworker. He argues that this wrought scrap is partially manufactured wrought iron, and that for working it in the scrapping furnace a less price is paid than for working pig iron or cast scrap—that is, it represents more labor and should bear a higher duty than pig or old cast iron.

It is evident from these facts that the workmen engaged in ironworking are determined that these evils shall be corrected, and it is fair to presume that their persistence, joined with their growing power and the aid they can bring from other industries,

must ultimately prevail. The course of legislation during the present session will be closely watched, and the heed Congress gives to the demands of labor carefully noted.

Changed Prospects in Peru.

A complete change has taken place in Peru since we last noticed the condition of that country. It will be remembered that on October 20, 1883, peace was concluded with Chili, and the following March the Peruvian Congress convened and General Iglesias took the oath of office as Provisional President of the Republic, the Constituent Assembly ratifying the treaty of peace with Chili. On July 24, 1884, General Cáceres proclaimed himself Provisional President of the Republic at Tarma, in opposition to Iglesias, the plea being that he, Cáceres, did not recognize the peace settlement with Chili involving the cession to the latter of the Department of Tarapacá. He then began to wage war on the Constitutional Government, and continued his operations till on December 3 last he vanquished the legitimate President and his troops in the streets of Lima. Through the good offices of foreign ministers an agreement was effected, by the provisions of which both Iglesias and Cáceres abandoned their claims to the Presidency, and a council of ministers was instituted, with Don Eusebio Sanchez as Minister of State and Provisional President of the Republic till the spring elections should give the country a new Congress and President. Both armies were disbanded, and the new army to be created reduced to a force of 3000 men.

Late accounts agree in asserting that the country is now tranquil, and that much enthusiasm is manifested by the people at the improved prospects. Cáceres, who for the time being virtually rules, is said to be very popular. Some people in Peru and abroad apprehend that, if elected to the Presidency, which is undoubtedly his aim, he will pick a quarrel with Chili and inaugurate another war, and that Bolivia, smarting under her exclusion from the Pacific Coast, may again join hands with Peru. Although in South American politics almost anything is possible, a resumption of the strife would find Chili so overwhelmingly strong both on land and sea that the struggle would appear hopeless from its inception, and in any event prove of short duration. Nothing could be more unwelcome to Chili than to have to undertake a second occupation of Peru, in which nothing worth fighting for could be gained, not even glory, for, so far as we are aware, Chili does not covet more Peruvian or Bolivian territory than she holds at present. But, even assuming that peace be kept with Chili, it would be hazardous too much to say that Peru has now entered on an era of peace and gradual recovery from ruin.

The public indebtedness amounted on January 1, 1882, to \$49,871,707. During the 14 months from October 23, 1883, to January 1, 1885, the income of the country was \$7,003,361, and the outlay \$7,059,382. Toward the income the following revenues contributed:

Duties on imports	\$3,739,067
Additional duty	955,732
Export duty	414,026
Dues collected	45,948
Total	\$5,154,833

The remaining \$1,848,522 being obtained from tonnage dues, general taxes and special trade taxation.

The outlay is represented by the following figures:

War and Navy Department	\$3,124,024
Finance Department	1,984,459
Government and police	1,774,965
Other expenditures	380,934
Total	\$7,059,382

To make both ends meet has been a most difficult task for General Iglesias while trying to reorganize internal administration with Cáceres in arms against him all the time. A glance at the sources of income shows that in an exhausted country like Peru the only things in the way of revenue that can be depended upon are the import and export duties, but, as they are fixed, they can hardly be expected to yield much more than they do, since the entire import in 1884 was only \$11,064,744, and the export \$7,958,625, making a total of \$19,023,369, yielding in duties \$5,108,897, as we have shown. If the duties were raised much, importation would diminish, for an impoverished people cannot indulge in luxuries.

Should the present administration and the one to follow it in the spring inspire confidence at home and abroad, capital may flow back to Peru, sugar machinery may be erected, and not only sugar-making, but other branches of agriculture, may revive, and, with returning prosperity, the purchasing capability of the people will go on increasing and commerce begin to flourish again. The Oroya Railroad, under the contract with Mr. Grace, will be finished, and capital may be found for other enterprises of the kind. But, of course, no capital can be obtained from abroad on reasonable terms so long as there is the least doubt about the intentions of the men in power. The country has contracted an enormous debt and has not paid a dollar of interest except so far as Chili returns some of it to Peruvian bondholders out of guano under her control. Such being the actual state of affairs, we cannot agree with the optimism expressed in certain quarters that from now forward everything is likely to go on smoothly in Peru. Iglesias did his best, and we presume he is not sorry for having been relieved of a task so difficult and thankless.

AMERICAN TRADE WITH PERU.			
Fiscal year.	Import.	Domestic export.	
1883.	\$2,356,918	\$487,360	
1884.	2,077,945	1,043,902	
1885.	1,764,860	735,979	

These figures show that our domestic export to Peru fluctuates widely, and we cannot expect it to be otherwise so long as the political and business situation remains uncertain. When Peru was a comparatively rich country, with an ample stock of guano and nitrate to draw upon, and 60,000 tons of sugar of a desirable quality to export, our trade with her was considerable. As long as the guano lasted and any amount of bonds could be floated the greedy politicians were satisfied; when these resources began to fail the disastrous war was undertaken, and the result proved anything but agreeable to the men who were responsible for it. Whether the instigators of the war are the proper men to restore the country even to a semblance of what it once was may well be doubted; hence the suspicion with which the present pacification is looked upon abroad is, in our opinion, well founded.

The fact that the boiler attendants at the station of the New York Steam Co. were recently found to have no engineers' licenses, and that the engineer in charge of the department at the time was asleep, has given rise to a good deal of unintelligent criticism and sensational newspaper talk. Everybody who has investigated the subject of engineers' licenses in New York, or, for that matter, in many other cities, knows, though he may not admit it, that an engineer's license has absolutely no value to the employer of a boiler or an engine attendant, and that it may be procured by many who, instead of the necessary qualifications, possess simply the money required to pay for it and some influence with the political engineer in charge. As a matter of fact it often represents merely a certain amount of money which has been paid to the city, and perhaps another amount which may have been turned over to somebody else for illegitimate support. Under the circumstances the indirect charge which has been made that the New York Steam Co.'s boilers are worked by incompetent men, and thus more than ordinarily endanger life and property in their neighborhood, will appear in its true light. There is no reason to believe that the interests of the company which center in the steam-supply station referred to would be left in unreliable hands, and thus, while there undoubtedly was a technical violation of the law, there was certainly nothing else.

The great strike of the coal miners on the Monongahela River, in Pennsylvania, has ended in their complete defeat. One pit after another had resumed or was about to resume work when a convention was called to decide what should be done, and by a vote of two to one in a body that but a week before were prepared to lynch any one who proposed to surrender it was decided to resume work. After seven months of idleness, a loss in wages of hundreds of thousands of dollars, with more suffering and misery than were ever known on the river before, 4000 men have resumed work, and those of them who are honest must struggle for years to clear themselves of the burden of debt they have assumed. This is a sorry ending to the struggle. If they had taken the advice of their own association and accepted the offer of the operators they would be in a different position to-day, but the hopes held out by another association warped their judgment and led to their discomfiture. A little more independence and self assertion on the part of the individual workman would have prevented, or at least shortened, many of the disastrous strikes of recent years.

Electric locomotion is evidently regarded abroad with much more interest and attention than has ever been given to it in this country, and promises alone, with a conspicuous lack of practical development, seem there to be the exception rather than the rule. Accordingly, we find that while in this country a vast amount of deceptive newspaper advertising has been secured by different electric railway companies, and little, if anything, of a practical nature has been accomplished, European, and notably English, engineers have furnished unmistakable proof of the capabilities of electric systems of propulsion. In view of the progress there effected, the lack of spirit, and perhaps also of merit, in connection with such electric enterprises here appears somewhat remarkable. The outlook that the smoke, dust and noise of the New York elevated railroad locomotives, for example, would at no distant date be suppressed by the introduction of electric motors did seem promising at one time, but public faith has long since been shaken. Evidently there is a serious hitch in electric locomotive engineering in this country, and a successful remedy, which does not seem to be very difficult to find, must be applied to reawaken public confidence.

The statistics of the grain-carrying trade of the port of New York, as prepared by President Ferguson, of the Grain Ceiling Co., do not make an exhibit very satisfactory to the shipping trade of the United States. Not one American vessel cleared from New York to Europe with grain in 1885. Of the total 47,000,000 bushels exported 20,374,434 bushels were carried in British vessels, 4,904,855 in German, and

upward of 4,500,000 in Belgian. Of the 1191 vessels employed 1095 were steamers carrying 44,221,791 bushels of grain and 93 sailers carrying 2,881,473 bushels. More grain by 1,709,477 bushels was shipped from New York in 1885 than in 1884, but there was a tremendous falling off from 1880, when 113,343,163 bushels were carried. The following are the totals for each year since 1879:

	Steam.	Sail.	Total.
1880.	49,966,579	63,376,584	113,343,163
1881.	53,255,728	19,020,583	72,276,311
1882.	39,878,449	6,384,389	46,262,838
1883.	44,305,009	4,252,086	48,557,095
1884.	42,961,799	2,431,958	45,393,757
1885.	44,221,791	2,881,473	47,103,264

The shipments of wheat in 1880 amounted to 61,408,508 bushels and in 1885 to only 16,959,504 bushels.

WASHINGTON NEWS.

(From Our Regular Correspondent.)

WASHINGTON, D. C., January 12, 1886.

The Speaker of the House of Representatives, in making his selection of chairmen for the various committees, acted upon the theory of giving each State one chairmanship for each four Democratic Representatives in the delegation. This rule seemed to answer the ulterior object of the Speaker and his friends, and at the same time had the appearance of impartiality. By this arrangement the South, least interested by representation, in the success of sound economic doctrines, received a large majority of the chairmanships, and the free-trade districts of the West a majority of what remained, with a slight representation from the East. The Committee on Ways and Means, practically the most important committee of the House, has been arranged with reference to pro-British legislation. The seven Democratic Members are pledged to tariff reduction. The five Republican Members are pronounced advocates of the Hamilton doctrine of protection. The committee, it is understood, will not undertake to urge action upon any measures until after the silver question shall have been disposed of.

In the organization of the two Houses of the Fifty-fifth Congress the following committees will have charge of economic questions:

HOUSE OF REPRESENTATIVES.

On Ways and Means.—Messrs. Morrison, Mills (of Texas), Hewitt, McMillin, Harris, Breckinridge (of Arkansas), Maybury, Breckinridge (of Kentucky), Kelley, Hiseock, Browne (of Indiana), Reed (of Maine) and McKinley.

On Commerce.—Messrs. Reagan, Clardy, Crisp, Caldwell, O'Ferrall, Tarsney, Pulitzer, Bynum, Irion, O'Neill (of Pennsylvania), Davis, Dunham, Weaver (of Nebraska), Johnson (of New York) and Morrow.

On Agriculture.—Messrs. Hatch, Aiken, Green (of North Carolina), Winans, Frederick, Davidson (of Alabama), Stahlnecker, Morgan, Glass, White (of Minnesota), Funston, Price, Hires, Pirce, Swinburne and Gifford.

On Railways and Canals.—Messrs. Davidson (of Florida), Murphy, Irion, Ellsberry, Henderson (of North Carolina), Stone (of Kentucky), Cole, Paddock, Atkinson, Plumb, Weber, Van Schaick and Pirce.

On Manufactures.—Messrs. Wise, Swope, Le Fevre, Wilson, Catchings, Lawler, Pindar, Campbell (of Pennsylvania), West, Van Schaick and Hires.

On Mines and Mining.—Messrs. Clardy, O'Ferrall, Hill, Skinner, Jones (of Texas), Neal, Gay, Barry, White (of Minnesota), Woodburn, Lindsley, Symes, McKenna and Bean.

On Labor.—Messrs. O'Neill (of Missouri), Foran, Lovering, Weaver (of Iowa), Lawler, Daniel, Tarsney, Crain, Funston, James, Haynes, Bound and Buchanan.

On American Shipbuilding and Shipowning Interests.—Messrs. Dunn, Holman, Mills, King, Bliss, Rankin, McMillan, Constock, Dingley, Wadsworth, Osborne, Felton and Romeis.

SENATE.

On Agriculture and Forestry.—Miller, N. Y., chairman; Blair, N. H.; Plumb, Kas.; Van Wyck, Neb.; Sawyer, Wis.; George, Miss.; Fair, Nev.; Gibson, La.; Jones, Ark.

On Commerce.—McMillan, Minn., chairman; Jones, Nev.; Conger, Mich.; Frye, Me.; Miller, N. Y.; Dolph, Ore.; Cameron, Pa.; Ransom, N. C.; Coke, Tex.; Vest, Mo.; Gorman, Md.; Jones, Fla.; Kenna, W. Va.

On Labor.—Blair, N. H., chairman; Mahone, Va.; Miller, N. Y.; Bowen, Col.; Palmer, Mich.; Call, Fla.; Pugh, Ala.; Payne, Ohio; Walthall, Miss.

On Finance.—Morrill, Vt., chairman; Sherman, Ohio; Jones, Nev.; Allison, Iowa; Aldrich, R. I.; Miller, N. Y., all protectionists; Voorhees, Ind., moderate protectionist; Beck, Ky., pro-British; McPherson, N. J., protectionist; Harris, Tenn., pro-British; Vance, N. C., pro-British.

On Fisheries.—Palmer, Mich., chairman; Sewell, N. J.; Dawes, Mass.; Stanford, Cal.; Morgan, Ala.; Harris, Tenn.

On Manufactures.—Riddleberger, Va., chairman; Sabin, Minn.; Mitchell, Pa.; Stanford, Cal.; Colquitt, Ga.; Butler, S. C.; Walthall, Miss.

On Mines and Mining.—Teller, Nev., chairman; Jones, Nev.; Van Wyck, Neb.; McMillan, Minn.; Hampton, S. C.; Fair, Nev.; Camden, W. Va.

On Railroads.—Sawyer, Wis., chairman; Hawley, Conn.; Sewell, N. J.; Sabin, Minn.; Riddleberger, W. Va.; Cullom, Ill.; Brown, Ga.; Kenna, W. Va.; George, Miss.; Blackburn, Ky.; Eustis, La.

On Transportation Routes to the Seaboard.—Aldrich, R. I., chairman; Cameron, Pa.; Manderson, Neb.; Palmer, Mich.; Cullom, Ill.; Gibson, La.; Vest, Mo.; Call, Fla.

NO ALLOWANCE FOR DISCOLORATION.

The Secretary of the Treasury has just decided that no allowance for damage on account of rust or discoloration occurring on the voyage of importation to guns or other manufactures of iron or steel can be made under the provisions in Schedule C, T. I., new, 184, no matter whether such damage was caused by ordinary or extraordinary circumstances during the voyage, the Solicitor of the Treasury having expressed the

opinion that it was the intention of Congress to withdraw from the operation of Section 2927 of the Revised Statutes all damage occasioned by rust or discoloration on iron or steel, or on manufactures thereof, and, consequently, that it was immaterial whether such damage was occasioned by ordinary or extraordinary circumstances on the voyage.

TEST OF STRUCTURAL MATERIALS.

Two bills for the test of structural materials have been introduced—one a bill by Mr. Campbell, of Pennsylvania, and the other by Mr. Payson, of Illinois. Mr. Campbell's bill is familiar to the Members of the last Congress. That of Mr. Payson for the appointment of a commission of experts for the testing of steel, iron and other building material provides that the President of the United States appoint a commission of seven members, selected from among men skilled in the investigation, production and use of metallic substances and other structural materials, to hold their appointment during the pleasure of the President of the United States, which commission shall plan and superintend the execution of such tests and investigations of materials used extensively in the construction of buildings, bridges, ships and other structures and machinery as they shall think most important to be made, and from time to time publish results of the tests and investigations, and also such scientific principles and practical rules deduced therefrom as they shall consider most useful. The commission are authorized to organize themselves, and adopt such rules and make such assignment of duties among the members as they shall deem most promotive of the object of their appointment. Vacancies to be filled by the President of the United States. The said commission are required to report their work, with its results and the deductions made therefrom, annually to the Secretary of the Interior. The members to receive mileage and expenses, but no salaries. They are authorized to appoint a principal expert to personally conduct the examinations and tests. Representative Campbell, who is again a member of the Committee on Manufactures, will call the bill up in committee, and will ask permission to report without delay, so that it may be considered during the first call of the Committee on Manufactures.

The Value of Foreign Coins.

The Director of the Mint is required by law to estimate annually the value of foreign coins as expressed in the money of account, and the Secretary of the Treasury is authorized to publish the same on the opening of the new year. Dr. Kimball has published the following table containing the new estimate he has just prepared:

Country.	Monetary unit.	Standard.	U. S. gold dollar.
Argentina Rep.	Peso	Double	\$0.36 5/8
Austria	Florin	Single silver	0.32 1/2
Belgium	Franc	Double	0.19 3/4
Bolivia	Boliviano	Single silver	0.75 1/2
Brazil	Milreis of 1000 reis.	Single gold.	0.54 0
Brit. Pos. N. A.	Dollar	Double	1.00 0
Chili	Peso	Double	0.19 3/4
Cuba	Peso	Double	0.93 2
Denmark	Crown	Single gold.	0.26 1/2
Ecuador	Peso	Single silver	0.75 1/2
Egypt	Fairste	Single gold.	0.04 9
France	Franc	Double	0.19 3/4
Ger. Empire	Mark	Single gold.	0.28 8
Great Britain	Pound sterling.	Single gold.	4.86 6 1/2
Greece	Drachma	Double	0.19 3/4
Haiti	Gourde	Double	0.95 5
India	Rupee of 16 annas.	Single silver	0.35 7
Italy	Lira	Double	0.19 3/4
Japan	Yen	Single silver	0.81 0
Liberia	Dollar	Single gold.	1.00 0
Mexico	Dollar	Single silver	0.81 0
Netherlands	Florin	Double	0.40 2
Norway	Crown	Single gold.	0.26 1/2
Peru	Sol	Single silver	0.75 1/2
Portugal	Milreis of 1000 reis.	Single gold.	1.00 0
Russia	Rouble of 100 copecks.	Single silver	0.60 1/2
Spain	Peseta of 10 centimes.	Double	0.19 3/4
Sweden	Crown	Single gold.	0.26 1/2
Switzerland	Franc	Double	0.19 3/4
Tripoli	Mahbub of 30 piastres.	Single silver	0.67 7
Turkey	Piastre	Single gold.	1.04 4
U. S. Colombia	Peso	Single silver	0.75 1/2
Venezuela	Bolivar	Double	0.19 3/4

The "standard" of a given country is indicated as follows: Double, where its standard silver coins are unlimited legal tender, the same as its gold coins; single gold or single silver, as its standard coins of one or the other metal are unlimited legal tender. The par of exchange of the monetary unit of a country with a single gold or a double standard is fixed at the value of the gold unit as compared with the United States gold unit. In the case of a country with a single silver standard, the par of exchange is computed at the mean price of silver in the London market for the three months ending December 24, 1885, as per daily cable dispatches to the bureau of the Mint.

There are some trade secrets which must be kept. Robert G. Solomon, of Newark, N. J., claims to have discovered valuable secrets in connection with the manufacture of Cordovan leather and the coloring and tanning of kangaroo, alligator and snake skins. He employed a bookkeeper and a superintendent with the explicit verbal understanding that they were not to divulge the secrets of his business. Subsequently they made arrangements, he alleged, to start a factory in opposition to his and use his alleged discoveries. He immediately sought redress in the courts, and Chancellor Runyon decided that "a discoverer of a secret process of manufacture, whether patentable or not, has property therein. * * * If the injunction was dissolved and the parties allowed to divulge the secrets irreparable injury would be done to the complainant. The defendants are restrained from using the secret process of which the complainant is the discoverer."

A few years ago there were but eight cities in Germany with a population of over 100,000; now there are 20. Berlin 12 years ago contained 800,000; now, at least, 1,200,000. The tendency there, as in the longest-settled States of the American Union, is concentration, to the neglect of rural districts.

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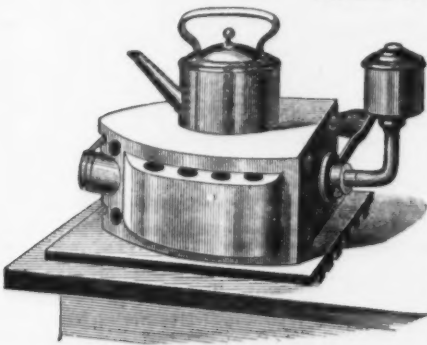
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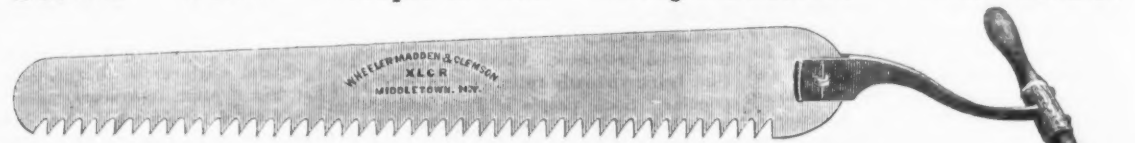
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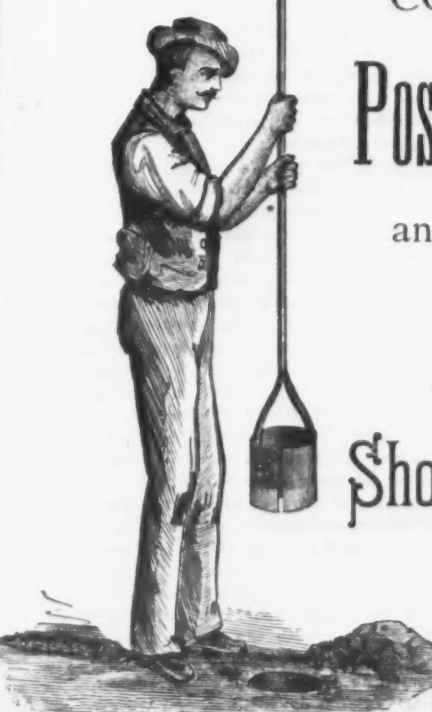
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EMPIRE KNIFE CO.,
West Winsted, Conn.

Wanted.

A competent Draughtsman accustomed to Steel Works construction and Steam Engineering. Address "DRAUGHTSMAN," Lock Box 1086, Philadelphia, stating salary expected, experience and references.

Special Notices.

SPECIAL NOTICE.

WE ARE NOW OFFERING

SPECIAL DISCOUNTS

ON

SHAFTING COUPLINGS, HANGERS AND PULLEYS.

The Edison Shafting Mfg. Co.,

86 to 92 Goerck St., New York.

CATALOGUES AND PRICE LISTS MAILED
ON APPLICATION.

RECEIVER'S SALE

OF

MACHINE SHOP, FOUNDRY AND
BLACKSMITH SHOP.

All Materials, Machinery, Tools, Fixtures and Personal Property in the Iron Foundry, Machine Shop and Blacksmith shop of G. H. Zachech & Co., Nos. 125 to 130 South Pennsylvania St., Indianapolis, Indiana, are offered for sale by order of Court.

Said Iron Foundry and Shops are in good running condition. The plant is well established. Circular and Band Saw Mills and all other articles usually made in a first-class foundry are successfully manufactured here.

Private offers for all or any part of the property will be received by the receiver at any time before February 14, 1886, and will be at once reported to the Court.

Sealed bids on all or any part of the property, in cash or upon such terms as may be offered, will be received at any time before noon, February 15, 1886.

All the property will be offered at public auction on the premises, in parcels and as an entirety, at one o'clock p. m. on February 15, 1886, excepting one Planer and certain Patents, which will be offered separately. The terms of sale at auction will be one third cash, one-third in six and one-third in twelve months. At the conclusion of the auction sale the sealed bids will be opened and reported to the Court.

All offers are subject to the approval of the Court.
A complete inventory and appraisal will be mailed on application.

JAMES JOHNSON,

Receiver of G. H. Zachech & Co., Indianapolis.

Smelting Works For Sale Cheap.

\$100,000 cash, balance in ten-year mortgage; consisting of two fine Buildings, Furnaces, Boilers, Engines, Root Blowers, large Steam Pumps, Pipes, Tanks, &c., all new nine months ago, and in perfect order; also a 99 year lease on ten acres of fine land. If a buyer is not found at once, I will sell any part to suit purchaser.

H. M. SCIPLE,

107 and 109 N. Third St., Philadelphia, Pa.

To Capitalists and Manufacturers.

For Sale as a whole or in parts to suit, in Westmoreland County, Pa., in and adjoining the Borough of Parnassus, 18 miles from Union Depot, Pittsburgh, 350 acres; over two-thirds level river bottom above highest water; remainder beautiful residence sites, equally divided by Allegheny Valley Railway; 300 yards from Tarentum gas pipes; 10-foot vein of coal under all, and gas rises along the whole seven-eighths of a mile on river front. For descriptive circulars, address JAS. W. DRAPE & CO., Pittsburgh, Pa. or ALEXANDER YOUNG, Parnassus, Pa.

SCRAP

WANTED Steel and Iron Scrap, Rails, Tires, Axles Turnings, Borings, Malleable and Burnt Iron, &c.

SCOTT & SMEDLEY,
455 Walnut street, - PHILADELPHIA, PA.
Dealers in every description of Iron and Steel.

WANTED.

A thorough business man with capital to join the advertisers in forming a Joint Stock Corporation for the purpose of manufacturing a valuable hardware specialty thoroughly covered by patents. They have a fine manufacturing property well located on the Connecticut River, close to rail and water communication; factory large and well supplied with Power, Tools and Machinery. A party to furnish the working capital and manage the financial part of the business would complete arrangements for a large and very profitable business. Any one seriously intending business will please address "A.," Lock Drawer No. 2, Post Office, Hartford, Conn.

Wanted.

Planer and Boring Mill, with all the latest improvements; Planer to have capacity of 8 by 20 ft.; Boring Mill 8 to 10 ft.

Address N. A. RAIL MILL CO.,
New Albany, Ind.

Wanted.

TRAVELING SALESMAN. One of experience and extended acquaintance with the wholesale Hardware Trade East and West may give entire time to our line or take one or more non-conflicting lines. Salary or commission.

Address "MANUFACTURER,"
Office of *The Iron Age*, 83 Reade St., New York.

WANTED.—By a young man with five years' experience in the Hardware business, a position as Clerk in Hardware store; can give unquestionable reference.

Address Post Office Box 124,
Lewistown, Penna.
A young man desiring practice in mechanical draughting wants situation. Good Penman and Mathematician. Salary no object.
Address "A.," Box 88,
Office of *The Iron Age*, 83 Reade St., New York.

Special Notices.

SECOND-HAND MACHINERY

In Good Order. For Sale Cheap.

1 Engine Lathe, 48 in. x 20 ft. bed.
1 " " 36 in. x 18 ft. " "
1 " " 30 in. x 16 ft. " "
1 " " 28 in. x 20 ft. " "
1 " " 24 in. x 12 ft. " " Pond.
1 " " 20 in. x 8 and 10 ft. bed. Putnam.
1 " " 17 in. x 8 ft. bed.
1 " " 15 in. x 6 ft. Porter. Rod feed only.
1 " " 15 in. x 6 ft. Plaster, with turret.
1 Mand Lathes, 13 in. x 4 and 5 ft. Garvin.
1 Planer, 50 in. x 50 in. x 17 ft.
1 " " 20 in. x 20 in. x 4 ft.
1 " " 36 in. x 36 in. x 7 ft.
1 " " 32 in. x 32 in. x 6 ft.
1 " " 17 in. x 17 in. x 5 ft.
1 Shaper each 20 in. and 24 in. stroke.
1 20-in. Plain Drill.
1 Lincoln Pat. No. 2 Miller.
1 Index Miller, Pond.
1 each 3, 4 and 6 Spindle, No. 0 Drills. P. & W. Co.
1 No. 1 Screw Machine. Machine Wire Feed.
1 Pratt & Whitney.
1 No. 2 Screw Machine. Wire feed. Pratt & Whitney.
1 600-lb. Drop Hammer. Pratt & Whitney.
1 40-lb. Trip Hammer.
1 12 in. Weston Electro-Plating Machine.
1 No. 3 Stiles Press.
3 Foot Presses.
2 Return Tubular Boilers, 16 ft. x 48 in.
1 Vertical " 54 in. x 8 ft.
2 Hoisting Engines, 8 and 10 H.P.
2 No. 2 Hand Milling. Pratt & Whitney.
1 Cutter Grinder, Pratt & Whitney.
1 15-in. stroke Shaper. Hendey.
2 No. 20 Presses. Bliss.
Also full line of New Machinery.
New York Agency TAYLOR MFG. CO., Engines, Boilers, &c. Correspondence solicited.
PRENTISS TOOL AND SUPPLY CO.,
P. O. Box 3562. No. 42 Dey St., New York City.

CHARCOAL FURNACE

For Sale.

TWO STACKS. Situated at Nicolet, Wisconsin.

For particulars apply to

ROGERS & CO.,

90 Dearborn St.,

Chicago, Ill.

FOR SALE CHEAP.

One "Strange" self-feeding and self-setting Barrel and Hoghead Stave Machine, 20-in. saw 36-in. stave, nearly new; cost over \$425 and will sell for \$240; cash; owner died and no use for it in this section. Also Portable and Stationary Steam Engines, Boilers, and the Eclipse Fan Blower, Tire Bender, and small Engines.
Address EZRA F. LANDIS,
Lancaster, Pa.

ENGLISH PLANER

For Sale.

Will plane 4 feet square and 22 feet long. Double Head. But little used.
STILES & PARKER PRESS CO.,
Middletown, Conn.

FOR SALE.

An old-established retail Hardware and Implement store in Central Ohio; stock good and well assorted; invoice about \$10,000; population of town 4000; good reason for selling.
Address "HARDWARE,"
Care of A. O. Jones & Co., Columbus, Ohio.

FOR SALE.

VERTICAL CONDENSING ENGINE,
54 in. diam. of cylinder x 48 in. stroke;
VARIABLE CUT-OFF.
20-ft. diam. x 60 in. face

50-Ton Band Wheel,

At a great sacrifice.

Engines, 4 to 100 H.P. to H.P. Baxter Engine, Worthington Pump, Sturtevant Blowers, Nos. 8 and 38, hydraulic Presses and Pump, Five Upright Boilers, 60 Horse. Pumps, Tanks, &c.
MARVIN BRIGGS, 60 Rutger St., cor. Water.

For Sale.

Heavy Upsetter or Bolt Header, suitable for Bridge Rods and Large Bolts; upset 3 1/2 in. Head to 3 in.; Friction Friction Clutch on it; also 4 in. Bolt Cutter, "National." The largest and most complete line of Bolt, Nut and similar machinery in the line in the world. Address
THE NATIONAL MACHINERY CO.,
Tiffin, Ohio.

FOR SALE OR WILL RENT.—My new brick shop in city of Worcester, Mass.; built heavy for any kind of work; 100 feet long; wide; four-story, with basement; within a few feet of the railroad.
Inquire of
LEWIS DEAN, Worcester, Mass.

FOR SALE.

A clean stock of Hardware, Stoves and Tinware, situated in a prosperous town of 2000 inhabitants in Central Illinois. Address "TOB,"
Office of *The Iron Age*, 83 Reade St., New York.

FOR SALE.—Machine Shop and Foundry, with fixtures. Situated one-half minute's walk from depot of three railroads. Price, \$4800. Possession May 1st, 1886. For further particulars, address LOCK BOX 245,
Middletown, N. Y.

Wanted, Situation.

By a gentleman of eight years' experience in the Iron Trade; would like a position as Traveling Salesman or Clerk in office. Can give best references and recommendations.
Address "K. B." care E. S. Adams,
Cleveland, O.

WANTED.—In a Light Hardware Manufactory in Chicago, employing upward of 75 men, an accountant conversant with factory accounts in all its branches, such as estimating cost of product, piece work &c., and to modern customs. Must be a man of proven ability. State age, nationality, expectations and reference. Address "SPECIALTIES," Office of *The Iron Age*, 83 Clark Street, Chicago, Ill.

A gentleman, (resident of London, Eng.), now visiting this country, offers his services as representative of some American firm desirous of establishing an agency in that city. The advertiser has a good knowledge of Machinery, Chemicals, &c., and an extensive acquaintance with English manufacturers and merchants. The highest references given. Address THOMAS CARTER,
P. O. Box 74, 379 Junction, Mass.

WANTED.—A situation as Superintendent, Manager or Foreman of an Iron or Brass Manufactory. Am an experienced practical mechanic in the manufacture of Engines, Presses, Dies and General Machinery; also Chandler, Kerosene Lamp and Brass Work; have had successful experience in the management of shops and hands. Can furnish good reference in all particulars. Address "L.,"
P. O. Box 510, Boston, Mass.

Special Notices.

MACHINERY.

SECOND-HAND, A1 ORDER.

Brown & Sharpe Universal Miller. Large and small.
Pratt & Whitney No. 2 Miller. Lincoln Pattern. Marking Machine.
Screw Machine No. 3. B'k Gear.
" " Engine Lathe, 15 in. x 6 ft.
" " " 16 in. x 5 ft. Taper.
Putnam Engine Lathes, 17 in. x 6 1/2 ft. No screw.
Rod feed only.
Fond Engine Lathe, 16 in. x 7 ft. Complete
Harrington " 10 in. x 6 ft. " "
Lincoln " 17 in. x 8 ft. " "
Bridgeport " 16 in. x 8 ft. " "
New Haven " 18 in. x 8 1/2 ft. " "
Rowland " 21 in. x 12 ft. " "
Ames " 20 in. x 10 ft. " "
Blaisdell " 26 in. x 12 ft. " "
Perkins " 26 in. x 10 ft. " "
Putnam " 42 in. x 16 ft. Rod feed only.
Saunders' 8-inch Pipe-Threading Machine, patent dies. Good as new.
20 in. x 4 ft. Planer. New Haven.
26 in. x 6 ft. Hendey.
36 in. x 12 ft. Niles.
42 in. x 12 ft. N. Y. S. E. Co.
No. 3. Stiles Punch Press.

Bolt Cutters, Milling Machines, Drills, Shapers, Lathes, Planers, &c., new, and also a line of second-hand machines not mentioned above.
State what you want to buy, and we will be glad to correspond with you.
Call and see us.

E. P. BULLARD,

14 Dey Street, New York.

MEYER, KINGSLAND & CO.,

Wholesale Auctioneers,

No. 10 Warren St., New York.

Regular sales of Hardware, Cutlery, &c. Sales cashed promptly. Consignments of goods solicited.

FOR SALE.

Merchantable Hoops, 1 1/2 x No. 16 and No. 17, and 1 1/2 x No. 17, in lengths from 2 to 5 feet.

A. R. WHITNEY & CO.

P. O. Box No. 33, New York City.

Cotton Gin Ribs.

HARDWARE MERCHANTS

and others furnished with materials of all kinds for making and repairing COTTON GINS, RIBS and SAWS for repairing ALL makes of gins. Send for Price List. Address THE BROWN CO., TON GIN CO., Manufacturers of Cotton Gins Feeders and Condensers, New London, Conn.

Vulcan Works, Baltimore, Md.

This old-established Foundry and Machine Shop for sale or lease. Has a complete equipment in all departments. Tools for sale. Send for catalogue. Address as above.

FOR SALE

BY

WILLIAM SELLERS & CO.

We offer for sale eight Swing Cranes, running from 10 to 50 tons capacity. One of the 50-ton Cranes is driven by steam and geared so as to raise or lower the load and run it in or out and swing the job simultaneously. The Cranes are in good order. We are taking them out of our foundry to make room for a high-speed power Traveling Crane we have just designed and built. For further information, address
WM. SELLERS & CO., Philadelphia.

Hardware Business For Sale.

A small, well-assorted stock of Hardware, Tinware and a good set of Timmer's Tools, in town of Locke, Cayuga County; a rare chance for a practical Timmer who has about \$1000 to invest.
Address H. S. DUNNING,
Auburn, N. Y.

FOR SALE.

Large lot second-hand Iron Tanks, from 5000 gals. down, all sizes and shapes.
Large lot new Mule Shoes
Large lot new 100 gal. Oil Tanks.
Three very large Cast Iron Kettles suitable for soap or chemical use.
50 tons Red Brass. 500 tons Wrought Scrap Iron.
BUSSENIUS, CUNLIFFE & CO.,
15th and Washington ave., Philadelphia,
Dealers in Scrap Iron and Old Metals.

FOR RENT.

A valuable mill property located in Philadelphia with business thirty years' established; both Water and Steam

vided is to be found in the revenues which annually flow into the sinking fund.

The Coinage or Silver Committee is expected to organize to-day and decide whether a hearing shall be afforded to representatives of coinage and anti-coinage measures or whether the consideration of the bill shall be limited to discussion among members of the committee exclusively.

About 30 of the lumber dealers of New York met on Tuesday and agreed to organize a Lumber Exchange. Several of the leaders in the enterprise, including Chairman A. T. Decker, are in favor of affiliating with the Maritime Association.

The Secretary of the Treasury awarded the contract for the cartage of packages to and from the appraisers' stores in New York City to Urz, Carrott & Kirby, at their bid of 18¢ per package and 1¢ per sample package. The New York Transfer Co. have done the work for the last two years.

An examination of the statistics of railway foreclosures for the last year in comparison with 1884 shows a tenfold increase as concerns the amount of capital invested, although the numerical increase for the year just expired is only 22, as against 15. The amount of stocks and bonds affected in the former year was \$23,500,000; in the latter \$278,500,000.

Metal Market.

Copper.—The Copper market in this city has been inactive, but remains strong at the following quotations: Lake Superior, spot and January, \$11.45 @ \$11.60; February, \$11.50 @ \$11.70, and March \$11.60 @ \$11.70; Baltimore, \$10.35 @ \$10.50, spot and January, February and March. In London Chili Bars have ranged as follows: January 7, £40.5; January 8, £40.10; January 9, £40.16; January 10, £40.10; January 11, £40.10.

The renewed weakness in England provoked,

A good deal of comment, but does not influence our market, because people on this side have a better opinion of the future of the metal than they seem to have on the other side. A preliminary estimate places the production of Ingot Copper on Lake Superior for 1885 at 71,412,000 lb. Export of Ingot Copper from the United States during the first 11 months of 1885, 34,527,975 lb, against 24,224,246 in 1884. Chilean export in 1885, 40,842 tons Fine, against 46,113 in 1884, 43,623 in 1883, 46,219 in 1882 and 42,337 in 1881. Import of American Copper into Liverpool and Swansea in 1885, 24,037 tons Fine, against 17,300 in 1884, 9410 in 1883 and 745 in 1882. Deliveries in England and France, 101,039 tons, against 107,145 and 94,334. Visible supply in England

and Frances December 31, 1885, 57,070 tons, against 47,843, 48,527, 47,053 and 50,593 in 1884-81 respectively. Price of Chili Bar 184, against 187. 5/, 258, 265 and 271. Spanish export during the first nine months of 1885, 630,460 tons Pyrites, against 452,119 in 1884 and 443,038 in 1883; Ingot Copper, 20,860 tons, against 13,055 in 1884 and 18,065 in 1883. For manufactures in this market dealers get 14½¢ for new Sheathing Copper, 15¢ for Braziers, 15¢ for Bolts and 17¢ for Bottoms. We are cabled from London this afternoon that the market is weaker.

Tin—Has been inactive and weak, both in London and here. So far this month 1000 tons arrived at this port. London quotes, spot, Straits, £91. 10/, and three months,

292. We quote large lines Straits on the spot, \$20.40 @ \$20.45; January, February and March, \$20.30 @ \$20.40. Imports of Tin into the United States during the first eleven months of 1885, 24,185,377 lb, against 23,318,139 in 1884; re-export, 59,888, against 57,442. We are cabled from London that the market is weaker. *Tin Plates*—Have been dull and weak, both here and in Liverpool, without being notably lower. We quote at the close, large lines, ordinary

brands, per box : Charcoal Bright, \$5 @ \$5.25, do Ternes, \$4.40 @ \$4.55 ; Coke Tin, \$4.45 @ \$4.60, and do. Ternes, nominally \$4.35. Liverpool quotes 13/9 for Cokes. Import of Tin Plates into the United States during the first 11 months of 1885, 476,319, 828 lb, against 451,177,676 in 1884; re-export, 653,718 lb, against 499,210. From London we are told that the market is weaker and that the manufacturers have abandoned the limitation of production.

Lead.—Spot Lead continues as scarce as ever, and by carloads Common Domestic sells at \$4.65, and some 100 tons Refined brought \$4.67½, but the general tendency is one of growing weakness at nominally \$4.60, so far as large lots for later delivery are concerned, and a similar feeling is reported from St. Louis. London is steady at £12. 2/6. Soft Spanish and £12 17/6. English.

Export of Pig Lead from Spain during the first nine months of 1885, 88,352 tons, against 85,029 in 1884, and 92,842 in 1883. Manufactures are quoted as follows: Lead

Pipe, 6 $\frac{1}{4}$ ¢ $\frac{1}{2}$ lb; Sheet Lead, 7 $\frac{1}{4}$ ¢; Tin-Lined Lead Pipe, 15¢, and Black-Tin Pipe, 40¢, allowing in trade for Old Lead delivered in New York, 3¢ $\frac{1}{2}$ lb. Shot, Drop, 6¢; Buck, 7¢; Chilled, 7¢. Shot in 5-lb bags, 4¢ $\frac{1}{2}$ lb extra. We are cabled from London that the market is a little firmer.

Spelter and Zinc.—The reaction against the December advance which is setting in against most metals is also felt to some extent in Common Domestic Spelter, which, we

year, is again offering a little lower from the West. Here we have been dull, but steady, at \$4.40 @ \$4.60. We quote Silesian, as heretofore, 5¢, and in London it is sustained at £14.17/6. Bertha Refined we call 8¢. *White Zinc* is quiet at \$5.15 @ \$5.35. Domestic

Export of Calamine from Spain during the

first nine months of 1885, 27,610 tons, against 23,883 in 1884 and 26,474 in 1883. From London we are cabled that the market is unchanged.

Antimony—Forms this week an exception, the stock being much reduced here, and Cookson is readily selling at 9½¢, while Hallett commands 9¢. London recovered from £15 to £16.

1. The first part of the paper is devoted to the study of the asymptotic behavior of the solutions of the system (1) as $t \rightarrow \infty$. It is shown that the solutions of the system (1) are bounded and tend to zero as $t \rightarrow \infty$ if the matrix A is stable. The second part of the paper is devoted to the study of the asymptotic behavior of the solutions of the system (1) as $t \rightarrow \infty$ if the matrix A is not stable. It is shown that the solutions of the system (1) are unbounded and tend to infinity as $t \rightarrow \infty$ if the matrix A is not stable.

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Trade Report.

New York Iron Market.

American Pig.—The market is quiet and steady, and considerable diversity of opinion is still expressed. The most conflicting statements are attributed to consumers of Pig Iron. There are undoubtedly some tributary to this market who have been buying more extensively than last year at the same time, and who state that a greater amount of work will make them buyers this year on a larger scale. On the other hand it cannot be denied that in some lines the outlook, so far as the immediate future is concerned, does not warrant the expectation of a heavier consumption of Pig Iron. In some lines—for instance, in the local building trade—it is feared that the quantity of Iron used will be smaller. Summarizing the situation, so far as it can be judged at so early a date in the year, it may be said emphatically that a larger tonnage will be required. The question is whether it will be heavy enough during the next few months to absorb the increased make. Concerning the latter it should be observed that a number of the anthracite furnaces which have recently gone into blast are running on Bessemer Pig, which do not effect the situation. Probably all of the balance started in with their order-books in fairly good shape for January and February. It depends upon the developments of the next few weeks whether or not they will be forced to come into the market eagerly or not. On the other hand some of the furnacemen who have been in blast all along are very stiff, and follow the policy of selling only moderate quantities, and then only for delivery during a part of the year. We quote for Standard brands, tidewater delivery, \$18 @ \$18.50 for No. 1 X Foundry, \$17 @ \$17.50 for No. 2 X Foundry, and \$16 @ \$16.50 for Gray Forge. Outside brands are 50¢ below these quotations. The quotations of \$16, \$17 and \$18 for the three grades of Chickies Pig Iron which we gave in our last issue are f.o.b. cars at furnace, not at tidewater, as might be inferred from the context in our last issue.

Scotch Pig.—The market is dull and arrivals light. We quote nominally as follows for small lots: Coltness, \$20.50 @ \$21 to arrive; Gartsherrie, \$20 @ \$20.50 to arrive; Shotts, \$20.50 @ \$21 to arrive; Carnbroe and Glengarnock, \$19.50 to arrive; Summerlee, \$20 @ \$20.50 to arrive; Dalmellington, \$19 @ \$19.50 to arrive; Eglinton, \$18 @ \$18.50 to arrive, and Clyde, \$18.50 @ \$19 to arrive.

Bessemer Pig.—There has been a sale of 10,000 tons to a Rail mill at private terms. We quote nominally \$20 @ \$20.50.

Spiegel Eisen.—We note a sale of 3000 tons English, and an inquiry for 4000 tons later delivery as yet not placed. Prices are nominally \$28 for English 20 %; \$32 @ \$32.50 for 30 % and \$67 for 80 % Ferromanganese.

Bar Iron.—The market is quiet, with an undertone of strength. We hear of a number of instances in which better prices by over a tenth have been paid for round lots than were realized in December. Concessions have become an exception. We quote for delivery here in round lots: Common Iron, 1.55¢ @ 1.60¢; Medium, 1.60¢ @ 1.75¢, and Refined Iron, 1.80¢ @ 1.9¢, with half extras. Store prices are 1.75¢ @ 1.80¢ for Common, 1.80¢ @ 1.90¢ for Medium, and 1.95¢ @ 2¢ for Refined.

Structural Iron.—The market is quiet, and as yet has not exhibited any sustained tendency to higher values. We quote Angles 1.95¢ @ 2¢, delivered, and Tees at 2.25¢ @ 2.35¢ for round lots. Steel Angles are quoted 2.35¢ @ 2.45¢, according to quality. Store quotations remain 2.2¢ @ 2.4¢ for Angles, and 2.5¢ @ 2.7¢ for Tees. American Beams and Channels are 3¢ base from dock for all orders.

Plates.—Buyers still succeed in placing orders at old figures, although the number of sellers is narrowing quite rapidly. We quote for round lots: Common or Tank, 2¢ @ 2.1¢; Refined, 2½¢ @ 2½¢; Shell, 2.4¢ @ 2½¢; Flange, 3.4¢ @ 3½¢; Extra Flange, 4¢ @ 4½¢. For small lots of Steel Plates the quotations are as follows: Ship, 3¢ on dock; Tank, 2½¢ on dock; Boiler, 3¢ @ 3½¢ for Shell, 3½¢ @ 4¢ for Flange, and 4¢ @ 5½¢ for Extra Flange and Fire-Box.

Merchant Steel.—The new scale of extras adopted at the Pittsburgh meeting has not yet been issued. Quotations for the range from ordinary to good grades are as follows: American Tool Steels 7½¢ @ 10¢; Tool Steel of special grades and finer qualities, 12¢ @ 20¢; English Tool, 13½¢ @ 15½¢; common grades, 7¢ @ 9¢; Crucible Machinery, 4.5¢ @ 6¢; Spring and Tire, 2½¢ @ 2½¢; Open-Hearth Machinery, 2.6¢ @ 2½¢, and Bessemer Machinery, 2¢ @ 2½¢.

Steel Rails.—It has been currently stated that prevailing quotations have been slightly shaded in the placing of a lot of 10,000 tons. The story is generally discredited in well-informed circles. If it should prove to have any foundation in fact it is surmised that it was a resale on the part of contractors who had bought in excess of their real wants in a speculative way. The market is firm at \$34 @ \$35, the latter quotation being the one at which the majority of Eastern mills are holding.

Steel Wire Rods.—The market is quiet, with only a small current business doing. We quote nominally \$42 @ \$43.

Old Rails.—We do not hear of a single transaction. Buyers are off, and until their requirements force them to enter it the market will maintain that attitude. Holders, on the other hand, are, so far as this market is concerned, stiff. As yet none of the English rails imported and afloat appear to have gone into consumers' hands.

Old Railway Leaf-Spring Steel.—We quote \$22, at which figure there have been sales.

Crop Ends.—The market is quiet, with quotations nominally \$21.50 @ \$22.

Old Wheels.—There have been sales of some small lots. It is reported that there is a lot of 700 tons of Southern Wheels on the market. We quote nominally \$15.50 @ \$16, according to quality.

Scrap.—The market is quiet, some holders asking 1¢ per pound. There have been recent sales from yard at about \$20. We quote \$19.50 @ \$20.50 from yard for No. 1 Wrought.

Rail Fastenings.—We quote 2.25¢ for Spikes, 2.75¢ for Bolts and Square Nuts, 2.9¢ @ 3¢ for Bolts and Hexagon Nuts, and 1.7¢ @ 1.75¢ for Splice Bars.

Messrs. Johnston & Jones, of Buffalo, agents of Andrews Bros. & Co., announce that their furnace is again in blast and that they are prepared to ship Haselton American Scotch Pig Iron. They state also that as members of the Western Steel Co., of St. Louis (old Vulcan Mill), they have facilities for procuring a regular supply of Soft-Steel Slabs, Blooms and Billets, and are prepared to execute orders for Steel Plates, Steel Shapes, Steel Hoops and Steel Bands, besides their specialties in Rolled Iron, which they continue to manufacture.

Philadelphia.

Office of The Iron Age, 230 South Fourth St., PHILADELPHIA, January 12, 1886.

Pig Iron.—The market has been remarkably steady considering the nervousness that was felt a little while ago. Prices appear to have settled on a firm foundation, and no efforts toward a change are likely to be made for some time to come. The heavy increase in production (estimated at 15,000 tons a week greater than it was four months ago) has imparted a feeling of indifference to consumers, so that they are not as anxious as they were to make contracts for forward delivery, while the amount already entered, in connection with a very liberal current demand, renders producers almost equally independent. Under these circumstances there is no reason for expecting any material change for some time to come, and prices are likely to remain as now quoted, say \$18 @ \$18.50 for No. 1 X at tide, \$17 @ \$17.50 for No. 2, and \$16 @ \$16.50 for Gray Forge, with the usual 50¢ @ \$1 additional on special brands. A very fair amount of business has been entered since the first of the year, and inquiries are such as to confirm the opinion that the increase in consumption is not much, if at all, out of proportion to production. The offerings for immediate delivery are not heavy, and some of the leading companies are said to be very much oversold for the next 30 or 60 days. It is hinted, however, that both buyers and sellers have made contracts a good deal beyond ordinary limits, the former not expecting to call for, nor the latter to be called upon, to meet their full engagements in the time specified. Reduced to legitimate requirements, it is not likely that there will be any embarrassment, either from a surplus or from a deficiency in supplies; hence a steady market is looked for at about to-day's prices.

Foreign Iron.—There is not much of interest in the market at present, and prices are about as last quoted, say \$20 @ \$20.50 for Bessemer, and \$28.50 for 20 % Spiegel. Inquiries from large consumers lead to the opinion that orders could be had on concessions of about 50¢ per ton, but holders are very firm.

Muck Bars.—There is a fair demand, but buyers do not respond very freely to the prices now asked, which range from \$29 to \$30 at mill. Sales reported at \$29 at mill.

Blooms.—Market steady at about the following prices: Charcoal Blooms, \$51 @ \$52; Runout Anthracite, \$41 @ \$42; Scrap Blooms, \$32 @ \$33, and Ore Blooms, \$33 @ \$34.

Bar Iron.—There is a pretty good demand on the whole, but mills in the country have a slight advantage on account of convenience in delivery to car shops and others at interior points. The city demand is only moderate, but taking the market all through there is a tendency toward improvement, both as regards prices and volume of business. Best Refined Bars are firm at 1.85¢ @ 1.85¢, with less cutting in extras than has been known for some time. The mills generally are tolerably full of work, and the outlook is considered better than for a long time past.

Plate and Tank Iron.—The demand keeps up fairly, and in the leading mills full time appears to be assured for some time to come. Some have four to six weeks' work on hand, others comparatively little, but the demand is widening, and orders received from day to day give promise of plenty of work straight along. Prices are not notably higher, but firm, as follows: Ordinary Plate, 2¢ @ 2½¢; Tank, 2.1¢ @

2.2¢; Shell, 2.5¢; Flange, 3.5¢; Fire-Box, 4.25¢; Steel Plates, Shell, 3.25¢; Flange, 3.5¢; Fire-Box, 4¢.

Structural Iron.—There are no features of special interest this week, but the outlook continues to be entirely favorable. Some of the mills are very full of work, others are running somewhat irregularly, but expect to fill in as the season advances, as there is likely to be an abundance of work. The tendency is toward firmer quotations, but until all the mills are moderately well filled up it will be difficult to maintain any general advance. Meanwhile sales are being made at about the following quotations: 2¢ @ 2.05¢ for Angles; 2.1¢ @ 2.2¢ for Bridge Plate; 2.4¢ @ 2.5¢ for Tees, and 3¢ for Beams and Channels.

Sheet Iron.—There is no special change in this department. The demand is satisfactory for the season, and prices are firm at the following quotations:

Best Refined, Nos. 26, 27 and 28..... 4 ¢
Best Refined, Nos. 18 to 25..... 3½ ¢
Common, ¼¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28..... 5 ¢
Best Bloom Sheets, Nos. 22 to 25..... 4½ ¢
Best Bloom Sheets, Nos. 18 to 21..... 4 ¢
Blue Annealed..... 3 ¢
Best Bloom, Galvanized, discount..... 57½ ¢
Common, discount..... 62½ ¢

Wrought-Iron Pipe.—Stocks continue well sold up and the demand is fairly good. Prices remain firm and not likely to change in the very near future. Quotations for large lots are about as follows: Lap-Welded Black, 60 %; Butt-Welded Black, 42½ %; Butt-Welded Galvanized, 32½ %; Lap-Welded Galvanized, 42½ %; Boiler Tubes, 55 %.

Nails.—The demand is slow, though the business done is quite up to the average of this time of year. Prices at last week's quotation are still adhered to, notwithstanding the reported fluctuation in other markets. All the works east of the Alleghenies have agreed to shut down for a period of six weeks at such time as best suits them between December 24th last and March 1st. This action, it is expected, will prevent an over-accumulation of stock, and go far toward maintaining firmness in prices.

Steel Rails.—There is still a good deal of inquiry, and evidently a considerable amount of business to come on the market in course of the next 30 or 60 days. Prices are steady and unchanged at last week's prices, say \$34.50 @ \$35 at mill, with several good sized lots taken at full quotations.

Old Rails.—There has been very little business because of the scarcity; there are sellers at \$23, however, for spot delivery, Philadelphia, with \$22 bid. Sales at interior points at a cost of \$22 @ \$24, delivered at mill.

Scrap Iron.—Demand active, and, with light offerings, prices are higher, as follows: No. 1 Wrought Scrap, \$19 @ \$19.50; No. 2 do., \$12.50 @ \$13.50; Turnings, \$14 @ \$14.50; Old Car Wheels, \$16 @ \$16.50; Old Steel Rails, \$18; Fish Plates, \$23 @ \$23.50; Cast Scrap, \$13.50 @ \$14; do. Turnings, \$10 @ \$10.50.

Engines and Boilers.—Business in this branch is reported considerably improved as compared with a month or two ago. Inquiry for new work is increasing, and there is every prospect of a better business shortly. The Harrison Safety Boiler Works are unusually active for this time of the year. They are just now erecting a 125-horsepower Safety Boiler for the Empire Mill, in Kensington, this city; also putting one in the old Drexel Building. These and other orders are sufficient to run full force and time for some time to come.

Pittsburgh.

Office of The Iron Age, 77 Fourth Avenue, PITTSBURGH, Pa., January 12, 1886.

General business has been almost suspended during the past three days, in consequence of the heavy snowstorm and extreme cold weather. Snow has fallen not only here, but through the West, and drifted to such an extent that many of the railroads are still blockaded, and country roads in many sections are simply impassable, snowdrifts ranging from 5 to 10 feet. The effect of this has been to materially curtail general business, which is always somewhat restricted at the opening of a new year. It will probably be a week or more before the railroads will be in the condition they were prior to the storm. The great coal-miners' strike in the Monongahela Valley was brought to a close last week, the miners going to work at the reduction. The nailers are still out, and so far as known at present, show but little disposition to yield to what appears inevitable. The general introduction of natural gas into rolling mills and manufactories of all kinds has displaced a good deal of common labor, but as an offset to this the natural-gas companies furnish employment to thousands of laboring men. Just now, owing to the extreme cold weather, there is but little doing in the way of putting down Pipe, but as soon as the spring season opens it will be recommenced and pushed forward with renewed vigor. All kinds of skilled labor are more fully employed here than they have been for a number of years. The firm of Carnegie & Co. are having some trouble with their employees, in consequence of which the Edgar Thomson and Pittsburgh Bessemer Works are shut down, but there is not much doubt that the matter will be adjusted within a few days. The trouble arose from a strike on the part of the men employed at the furnaces of the Edgar Thomson Works demanding an advance of 15 ¢ in

wages; an offer of 10 ¢ was made and refused; non-union men were put to work in their place, but the workers in the mill refused to work on Iron made by non-union men; hence the general suspension of both the mills named.

Ore.—There is nothing new to note; brokers who make a specialty of Ore report a fair business at steady prices. The consumption is steadily increasing, not only here but in the Shenango and Mahoning valleys, where quite a number of furnaces have started up recently and others are being put in condition to start up.

Pig Iron.—While there is not the flurry that prevailed a month ago, the market continues fairly active and the recent advance is fully maintained; \$16, cash, is the ruling price of Standard Forge Irons, and sales were made during the week at that price. All the furnaces in the Mahoning and Shenango valleys are holding for \$16, cash, at furnace, and it is said that sales have been made out there at the price in question, which would be equal to \$16.65 @ \$16.75, cash, delivered in Pittsburgh. Bessemer Iron is easier, owing to an increased production, but prices remain unchanged. Foundry Irons continue slow, but prices are steady. Consumers continue to complain that the raw article is out of all proportion as compared with prices of the products, but producers point to the increased cost of production, which they aver has absorbed a large percentage of the advance. Some mills are pretty well stocked, having contracted freely some time ago, before prices got up to where they now are. Quotations may be fairly given as follows:

No. 1 Gray Forge..... \$16.00 @ 16.25, 4 mos.
No. 2 "..... 15.50 @ 15.75, 4 " "
All-Ore Mill..... 17.50 @ 18.00, 4 " "
White and Mottled..... 15.25 @ 15.50, 4 " "
No. 1 Foundry..... 15.00 @ 15.50, 4 " "
No. 2 Foundry..... 15.50 @ 17.00, 4 " "
Charcoal Foundry..... 21.00 @ 23.00, 4 " "
Cold-Blast Charcoal..... 25.00 @ 27.00, 4 " "
Bessemer Iron..... 30.00 @ 30.50, 4 " "

We can report a sale of 500 tons Bessemer Iron at \$20.50, four months; 1000 tons of Gray Forge at \$16, four months, at furnace, equal to about \$16.25, four months, delivered at mill of buyer, and some 1500 tons do. in lots (made from native Ore) at \$16, four months, also 500 tons do. (made from Lake Ore) at \$16, cash. In regard to Bessemer Iron a broker said yesterday that he could offer from 1000 to 5000 tons at \$20, four months.

Muck Bar.—Is firmer and higher. We are reported sales of some 2500 tons, said to have been bought on speculation at \$27, cash, and there are but few of the mills willing to sell under \$28, cash, at mill.

Manufactured Iron.—There is a fair degree of activity, and prices are firmer, with manufacturers, as a rule, refusing to contract for future delivery at present prices. It is admitted on all hands that Pig Iron is bringing a better price relatively than Finished Iron, and it is very evident that there will have to be a change one way or the other—an advance in Finished Iron or a decline in the raw article. We continue to quote Bars 1.70¢ @ 1.75¢, 60 days, 2 ¢ off for cash, for well-assorted orders.

Nails.—The Nail trade continues quiet, and no material improvement need be looked for until the spring trade opens up. Steel Nails remain unchanged at \$2.50, 60 days, 2 ¢ cent. off for cash, with a rebate of 10¢ per keg on carloads and upward. Nothing new to note in connection with the strike, which still continues. The regular monthly meeting of the Western Association takes place at Cincinnati to-morrow.

Wrought-Iron Pipe.—There is nothing new to note in connection with this important interest. While new business is not offering so freely, the mills are reasonably well employed, and the outlook is that the trade of 1886 will exceed that of 1885. Prices are firm at combination rates. Discounts on Black Butt-Welded Pipe in carlots and upward, 45 %; less than a carload, 42½ %; do., Galvanized, 35 % in carlots, and 32½ % for less; Black Lap-Welded Pipe 62½ % in carlots, and 60 % for less than a carload. Discount on Boiler Tubes 55 %; 2-inch Oil Well Tubing, 13¢ per foot, net; 5½-inch Casing, 40¢; 8-inch Drive Pipe, \$1.30.

Steel.—The meeting of Steel manufacturers last Friday in this city did but little more than organize; some important changes were made in classification. The matter of prices was not touched, but will probably be taken up at the next regular meeting, when there is not much doubt all grades of Bessemer Steel will be advanced. Bessemer Blooms are quotable at \$32 @ \$35 per ton, and Nail Slabs at \$31.50 @ \$32. Steel Rail Ends quoted nominally, in the absence of sales, at \$21.50 @ \$22, and Bloom Ends at \$21 @ \$21.50.

Steel Rails.—The market is reported steady at \$35 @ \$35.50, cash, at mill for Heavy Sections. Prices have not fluctuated much of late.

Old Rails.—Old Iron Rails continue scarce and prices are still tending upward. We are advised of bids of \$24.25 having been made, and we hear of sales at \$23 at Chicago, which make them cost \$26 to bring them here from that point, as the freight is \$1 per ton. Old Steel Rails also firm, and tendency upward. Sales of mixed lengths at \$22 and long lengths at \$23.

Railway Track Supplies.—There is not much doing at present, but the outlook is favorable for a good spring trade. Prices firm, but unchanged. Spikes, 2.25¢, 30 days, delivered; Splice Bars, 1.70¢ @ 1.75¢; Track Bolts, 2.75¢ @ 2.85¢.

Old Material.—The market is not so active, but prices remain unchanged. No. 1 Wrought Scrap, \$18 per net ton; Wrought Axle Turnings, \$14; Old Iron Car Axles, \$23; Cast Borings, \$11.50 @ \$12, gross; Old Wheels, \$16.50 @ \$17, gross.

Coke.—Blast-Furnace Coke remains unchanged at \$1.20 per ton, free on cars at ovens. The syndicate will make no change in prices this month.

Chicago.

Office of The Iron Age, 36 and 38 Clark St., Cor. Lake St., Chicago, January 11, 1886.

Hardware.—The first two weeks of the year open up auspiciously in a general way, though in the jobbing trade they have been a period of quietness and rest from active business. The changes in the weather are responsible for fluctuation in the demand for some lines of goods. Early in the season Sleigh Material and Sleighing Equipments were freely called for, as were also Skates and Ice Tools. Then came the warm sun and rains, which changed the snows into slush and mud, interfering with country travel and cutting off consumptive demand for pretty much everything. In some sections rivulets were transformed into rivers and rivers into impassable gulfs, delaying railroad traffic and interfering with the shipment and receipt of goods. About the middle of last week came a change to the other extreme—a snow storm of great severity. Again traffic is interrupted through the West. Trains are snowbound in nearly every direction and freight shipments have been suspended. The prospects are more than ordinarily favorable for a good spring trade. Mail orders for small supplies are coming in freely for the season. Heavy Hardware has been in good demand, with Wagon and Carriage Wood Material selling more rapidly than for several years at a corresponding time. Numerous changes in price lists are being made and announced.

Barb Wire.—So far as the market relates to the making and selling of Wire, there is no change from the situation noted two weeks ago. Jobbers continue to quote Painted at 4¢, and Galvanized at 5¢, 10¢ off in carlots, and report that they are receiving orders quite freely at these figures for immediate delivery; more so, in fact, than they are inclined to accept, as the prices which will be current after the 14th inst. are somewhat in doubt. The last meeting of the Plain-Wire drawers confirms the prediction that prices will be advanced at the next meeting of the manufacturers. The bottom price now named for Nos. 12 and 12½ is 3¢, and 3½¢ for No. 13, by the 100 lb. Makers of Barb Wire state that this will require an advance of at least another ½¢ per lb in order to let them out whole on their product. There is a lively interest manifested among consumers on the subject, and frequent efforts are reported where buyers have attempted to place their orders for large lots to be delivered during the next two months at present prices.

Nails.—There are indications of prices stiffening. Jobbers are still quoting Iron Nails at \$2.50. The regular price on Steel Nails is \$2.70, but we hear of this figure being shaded 5¢ per keg. In carlots both Iron and Steel are selling at 10¢ per keg less. The stock of Steel Nails seems to be only moderate, with the chances that the supply will not be sufficient to meet the demand that is likely to occur within the next 30 days. All jobbers appear to have very good stocks of Iron Nails, but are not inclined to sell more freely than they must. Manufacturers are more firm in prices named, and the slight advance in freight rates advanced the price at which Nails can be laid down here 5¢ @ 10¢ per keg within the last 10 days. We hear of some large lots that have been bought for future delivery, but in a general way manufacturers are not inclined to make prices for anything except immediate shipments.

American Pig Iron.—Salesmen report the demand for the season exceptionally good. There are purchasers in the market for lots of almost any size, but the majority of sales are made in quantities ranging from 50 to several hundred tons. Lake Superior Charcoal Irons range in price from \$23 to \$24, four months, according to time of delivery. On a lot of 1000 tons \$24 @ \$25 has been named as the bottom price for monthly deliveries to May 1, but the buyer was unwilling to offer more than \$23, and requested an option at this figure. From the present outlook prices now quoted are likely to be more steady, and the possible advance that may occur in the next two months will be made in small amounts and in a more regular manner. The jumping up in price of \$1.50 a ton within a week or 10 days greatly unsettled the entire market, and furnacemen began to think there was no limit to the prices which they might obtain. But the slowness with which some branches of Finished Iron have followed the advance retards the movement, and until better prices can be secured for the manufactured there cannot be a much greater advance in the crude material. Coke Irons are unchanged at \$19 @ \$20, and vary in price according to the quality of the Iron. The late change in the Pig-Iron market has operated against Cinder-Mixed Irons to some extent, lessening the supply and curtailing the demand, which makes the price—\$18 @ \$18.50—quotable largely from the association in material, and not with the same firmness that is noticed in other classes.

Ohio Standard Blackbands are among the most active, and furnaces are decidedly firm in their price. Quotations on Briar Hill are made at \$22 as bottom price for immediate delivery. Hubbard has been advanced to \$21.50, cash, for No. 1, and Low Moor is quoted at the same figure for immediate delivery. For Hazelton they are now asking \$20.50 @ \$21, and for Hanging Rock Irons \$20, cash, for No. 1. No. 1 Southern is quoted at \$19.50; No. 2, \$18.50; No. 2½, \$17.50; No. 1 Mill, \$17.25 and No. 2 at \$16.75, cash and four months. Makers of Southern Iron differ somewhat in their ideas of price, being perhaps governed by quality or stock on hand, which admits of this quotation as cash for some brands and four months for others, with the continued statement from several furnaces that they have no Iron to market at these prices. Buying during the last 30 days has been in small and medium lots for prompt delivery, upon which prices have continued firm. There are now in prospect sales on which the period of delivery will extend into the summer. When such contracts are made the strength of the market will be severely tested. On Friday of last week all freight rates were withdrawn by Southern railroads to points on the Ohio River, pending a proposed advance of 55¢ per ton on Southern Pig Iron. An effort to compromise on 30¢ per ton was not successful. All transactions on this class of Iron are suspended until the matter is definitely settled.

Merchant Steel.—Jobbers of the better grades are making more favorable reports concerning the market. They say that the demand has been unusually good for this time of the year, and that buyers are taking hold with greater willingness and in larger quantities than was customary during last year's trade. They also state that there is sufficient ground for the belief that some advance will be made very soon, and they are apparently hopeful of a general revival in the entire market. The refusal of some of the manufacturers of Low-Grade Steels to take orders for some time past has brought out a fair demand for that grade of material, and prices have materially stiffened, though no great changes are noted in quotations. We renew the following prices as being the bottom quotations made on small lots in this market: High-Grade Tool Steel 9½¢ @ 13½¢; Low-Grade and Ordinary, 7½¢ @ 9¢; Crucible Machinery Steels, 5¢; Open-Hearth and Bessemer, 2½¢ @ 3¢; Patented Plow Steels, 5¢.

Steel Rails.—The demand for Steel Rails has been remarkably quiet. Mills continue to quote \$38 @ \$40 as a nominal price.

Plate and Tank Iron.—Jobbers here report that the demand for this class of Iron has been exceptionally good for the season, and make the following quotations from store: Steel Boiler Plate Flange, 4¢; do., Fire-Box, 4½¢; Tank Iron, 3¢; Shell, do., 3¢; Heavy Sheet Iron, Nos. 10 to 14, 2.60¢; No. 16, 2.80¢; No. 18, 3¢.

Bar Iron.—Common is quoted at 1.70¢ rates in carload lots as bottom price for immediate delivery, and at 1.75¢ @ 1.80¢ rates from store in smaller quantities. Jobbers claim that the demand during the month of December was considerably better than for the same month the two previous years. Notwithstanding this no change in price has been made, while they acknowledge that they cannot buy Iron from makers at less than 1.75¢ rates, delivered here. New Puddled Irons are quoted at 1.80¢ rates from store, and it is possible that this price could not be shaded for any quantity at the present time. Jobbers who handle this make of Iron exclusively are making no quotations except for immediate shipment, and will possibly advance the price to 2¢ rates before the close of this week. All orders that are received are held in abeyance, and on specifications for future shipments no price will be made until the subject of raw material and freights are more fully understood.

Old Rails.—The market continues to be firm and prices steadily advancing. Numerous buyers of 100 to 1000 tons are in the market at \$22, but no Rails can be had at this figure. Those who have the stock decline to sell at less than \$23 @ \$24, and would possibly not dispose of large lots at this figure. On Old Steel Rails \$18.50 is offered, with prices demanded ranging up to \$19.50.

Old Wheels.—There has been quite a lively demand in the last two weeks, and prices have advanced to \$18.50, at which figure small lots have been sold and refused. Holders are now asking \$20, and it is not likely that any large quantities could be had at less than \$19. Stocks appear to be in fairly good supply, but concentrated in the hands of so few persons that they have almost the entire control of the market, and are inclined to make the most of the situation.

Scrap Iron.—Market a little firmer; no change in quotations.

Pig Lead.—Market strong, spot and futures commanding 4.40¢. The quantity of Lead offering is limited, but apparently adequate for all present consumptive demands.

Chattanooga.

Office of The Iron Age, Carter and Ninth Sts., CHATTANOOGA, January 11, 1886.

This district has during the past week experienced the coldest weather ever recorded here. The effect has been to close down many of the manufacturing establishments, including some of the furnaces, none of

which are prepared for such extreme cold weather. The railroads have also been seriously affected in the running of their trains. A question of much importance to the furnaces has recently been agitated in this city. At a meeting of the general freight agents of the different lines, held for the purpose of discussing what should be the future Pig-Iron rates, it was held by the railroad men that the freights ought to be raised about 33% over the present rates. This was stoutly resisted by the representatives of the different furnaces, who contended that the advance ought to be only in the ratio of what the price of Iron had advanced. A compromise was offered by the furnacemen of 20% advance on present rates. The representatives then came down to an advance of 25%, but, no agreement being effected, the meeting adjourned for future action. It is more than probable that an advance will soon go into effect of 20% to 25% over present rates. Trade in general lines of business is dull, and will probably remain so during the greater part of the present month.

Pig Iron.—The prices of Pig Iron remain firm at figures realized the last of the year, and many more offers are made than the furnaces are inclined to accept. The furnaces as a general thing are taking the ground that prices will not go any lower, with a strong probability of an advance early in the season. One great reason for thinking so is the fact that many of the large producers have received letters making direct offers for large round lots to run through the entire year, payments to be made in cash when loaded on the cars, and some are of the opinion that with the use of a little "sand" the result would be quite a stiff advance in the near future. At any rate Pig Iron is no drug at the present time. The demand from Southern consumers continues good, and so far as appearances go is likely to continue so for months to come. The change of the gauge of most of the railroad lines, which is to take place early in the summer, is adding very much to the work of Southern machine shops and foundries, and with many of them this one branch of work will be a large item and will necessarily require a large amount of Pig Iron.

Bar Iron.—Most of the mills are now on double turn on Bars, and the demand is more than the ability of the works to turn out. Prices are stiff, with the prospect of increasing trade; 1.70¢ is the ruling figure for carload lots.

Hardware.—The demand for goods that enter into the construction of buildings is good and prices are ruling regular. In Sash, Doors and Blinds the works are kept running full time, and some are making extra time.

Lumber.—This business appears to be going ahead of everything else; the mills are all kept very busy and the demand is greater than the capacity. The item of Car Lumber has increased lately very much, and it is not an uncommon thing to see entire trains heavily loaded exclusively with Car Sills and other Framing Lumber.

Birmingham.

BIRMINGHAM, Ala., January 11, 1886.

Money seems to be painfully scarce in this part of the country, for, in spite of the improvement in some important lines of business since the middle of the fall, collecting has been rather more unsatisfactory work since New Year's than ever. This is about all that business has developed since the holidays. The latter part of last week, just about the time when buying and selling ought to have begun again, the cold wave, to which nothing comparable has been felt in this latitude this winter, came along and paralyzed everything but absolutely necessary business. Horse-cars and drays and even some of the coal wagons stopped running. One of the Sloss furnaces shut down for a day, and every foundry in the city had to stop because its sand was frozen.

Pig Iron.—Everybody who has Pig Iron to sell disposes of it easily enough now at the figures quoted for some four weeks, and the signs still promise a rise, if anything. Several recent offers that have come here for future delivery indicate confidence that Iron is going higher. Most of these have been declined, though some for 60 or 90 days' delivery have been booked. The demand for Foundry Irons is conspicuous, possibly because there is a larger proportion of them made here now than there ever was before. Judging from the business that comes this way the West is reacting from its holiday lethargy more rapidly than the East. Indeed, more inquiries and more offers have been received from the West in the last few days than for a long time before, and a good many of them have come from markets that low prices practically closed to Southern furnaces last spring and summer. Iron is again going from here to Chicago and even Detroit. A rather disheartening fact for this trade, though, is, according to notices sent out by the railroads, an advance of some 30% in freight rates to all Northern and Western points, which goes into effect today. Some of the furnacemen here went to Chattanooga on Saturday to confer with railroad authorities on this point, to what purpose remains to be seen.

Finished Iron.—There is nothing new in the rolling mill business here except that no Iron has been made for several days, a break of machinery being the cause. Prices,

demand and promises are about what they were a week ago.

Nails.—Brierfield and Helena still sell Nails steadily enough at \$2.45, the rate quoted by them two weeks ago, and this now lays them down, if anything, a trifle cheaper than they come from Northern makers.

Cast Pipe.—Birmingham's comparatively small product in this line is now sold ahead, as the whole country's seems to be, and prices are at least good enough to sustain the advanced quotations of the last few weeks.

Coal.—With proper allowance for the holidays the Coal business may be pronounced a little better than it was a month ago. The consumption at the furnaces, in both Coal and Coke, is very heavy again, and there is a very satisfactory demand for Domestic Coals.

Yellow Pine Lumber.—The Yellow Pine Lumber business of Middle and South Alabama is constantly growing. Not only are the shipments very heavy, but the demand is very imperative in its terms. Hardly any concern of respectable size has any time to stock Lumber on its yard in any considerable bulk nowadays. A good business is doing with the East as well as with the Northwest, some Lumber going as far east as Hartford, Conn.

Cincinnati.

JANUARY 11, 1886.

Pig Iron.—No change in the condition of the market in the past week, prices remaining firm at quotations, the demand being mainly from foundries and for immediate use. The inquiries from foundrymen in the past two weeks for larger supply through the coming six months are mainly to get quotations upon which they may base contracts to furnish castings. It seems to be the disposition of both consumer and producer to trust the future. It is thought that the Iron interests in the West and South are entering upon the business of this year with the uncertainties of the past year, only with the difference, as is already developed, that Rail mills and the Cast-Iron Pipe foundries have large orders booked beyond any experience in the past two years and enough to last into 1887. The manufacturers of Merchant Bar Iron and Nails in the West and South express encouragement not only that there will be an increased volume of business, but that better paying prices will prevail. It is reported that car-builders have already covered their wants of Pig Iron to meet their large contracts for cars to be furnished in the coming six months. The following quotations for the past week are f.o.b. here, or less the freight to Cincinnati if orders are filled direct from furnaces, 50¢ per ton discount for cash on time prices:

CHARCOAL FOUNDRY.	
Tennessee Alabama and Georgia, No. 1, 4 mos.	\$18.00 @ \$18.50
Tennessee, Alabama and Georgia, No. 2	17.00 @ 17.50
Hanging Rock, Best No. 1, 4 mos.	21.00 @ 21.50
Hanging Rock, Good, No. 1, 4 mos.	19.50 @ 20.50
Hanging Rock, Good, No. 2, 4 mos.	17.00 @ 18.00

COKE FOUNDRY.	
Ohio and West Pennsylvania, No. 1, 4 mos.	18.50 @ 19.25
Ohio and West Pennsylvania, No. 2, 4 mos.	17.00 @ 18.00
Southern No. 1, 4 mos.	18.00 @ 18.50
Southern No. 2, 4 mos.	17.00 @ 17.50

SILVER-GRAY SOFTENERS.	
Hanging Rock (Jackson County), No. 1, 4 mos.	19.00 @ 19.50
Hanging Rock (Jackson County), No. 2, 4 mos.	18.00 @ 18.50
Hanging Rock (Jackson County), No. 3, 4 mos.	17.00 @ 17.50
Other makes.	16.00 @ 18.00

CAR WHEEL.	
Hanging Rock Cold-Blast, 4 mos.	25.00 @ 26.00
Hanging Rock Warm-Blast, 4 mos.	19.00 @ 20.00
Southern Warm-Blast, 4 mos.	17.50 @ 19.00
Southern Warm-Blast, Standard, 4 mos.	23.00 @ 25.00
Georgia Cold-Blast.	25.00 @ 26.00

FORGE.	
Range of grades and makes.	15.00 @ 16.50
SCHIAP.	
Rails.	18.50 @ 19.00
Wheels.	16.00 @ 17.50

No sales reported.

Louisville.

W. B. BELKNAP & Co., Louisville, under date of January 11, report as follows: The new year comes in eagerly scanned by all. Will it bring us better fortune than the 1885 combination, which did not seem to draw the big prizes we looked for? By dint of conclave and mysterious withdrawal of prices it would look as though the manufacturers had arranged with the fickle goddess to favor 1886, and, like the darkey's magical 4-11-44, which always draws big on Christmas day, it is to delight the wondering crowd. One finds in their mail every day some salty gossip about the near birth of that child so many prophesied—the "boom." There may be some doubt as to the authenticity of the parentage, but applicants to father the result will not be wanting. The change of the Lock list is discouraging. It looks too much like old times. But the news of an advance in lower grades of Steel, Hinges, Bar Iron, &c., has undoubtedly stimulated some demand, not yet, however, a very heavy one. The tightness of money in this immediate section has a serious effect upon the placing of any large orders, and until the country merchant can collect some of his old debts he is foolish incur new. The demand for Nails is fair, but not speculative. Barb Wire is fairly active at advanced figures, but apparently certain manufacturers are not so busy but that they can get up some quite spicy documents about the gates that have been so long ajar being closed against those unwashed in the licensed pool. Orders for Hardware are confined exclusively to what are termed reasonable goods, which are active.

GEORGE H. HULL & Co., of Louisville, report to us as follows under date of January 11: The market for Pig Iron during the past week have been very active, and sales of about 12,000 tons have been booked at full prices. The advance has been fully established. The furnaces are continuing in the same position—that is, discouraging everything tending to create a further advance—and, although some will not quote at all, others are endeavoring as far as ability will allow to set the demand at full market prices. We quote for cash in round lots as below:

PIG IRON.	
Southern Coke, No. 1 Foundry.	\$18.00 @ \$18.50
" No. 2	17.00 @ 17.50
" No. 2½	16.50 @ 17.00
Hanging Rock Coke, No. 1 Foundry.	18.00 @ 18.50
Hanging Rock Charcoal, No. 1 Foundry.	19.00 @ 20.00
Southern Charcoal, No. 1 Foundry.	18.00 @ 20.00
Silver Gray, different grades.	16.50 @ 17.00
Southern Coke, No. 1 Mill, Neutral.	16.00 @ 16.50
" No. 2	15.00 @ 15.50
" No. 1 Cold Short	15.50 @ 16.00
Charcoal, No. 1 Mill.	16.50 @ 17.00
White and Mottled, different grades.	13.00 @ 13.50
Southern Car-Wheel, standard brands.	23.00 @ 24.00
Southern Car-Wheel, other brands.	17.00 @ 21.00
Hanging Rock, Cold-Blast.	24.00 @ 25.00
" Warm-Blast.	18.00 @ 21.00

St. Louis.

W. H. SHIELDS, 305 Olive Street, St. Louis, reports, under date of January 11: The market as a whole is somewhat irregular, and it is doubtful if we will have the advance anticipated with the opening of the new year; other lines of business do not seem to respond. I quote nominally as follows:

CHARCOAL FOUNDRY.	
Missouri.	\$16.50 @ \$18.00
Southern.	18.50 @ 19.50
COAL AND COKE FOUNDRY.	
Missouri.	16.50 @ 18.00
Southern.	17.50 @ 18.50
American Scotch.	18.00 @ 21.00
MILL IRON.	
Missouri.	16.00 @ 17.00
Southern.	16.00 @ 16.50
CAR-WHEEL AND WALLEABLE IRON.	
Southern.	20.00 @ 24.00
Lake Superior.	21.00 @ 23.00
SCHIAP, ETC.	
Old Wheels.	16.00 @ 17.00
Old Rails.	21.50 @ 22.00
Connellsville Coke (East St. Louis).	5.30 @ 5.50

Detroit.

CHARLES HINCHER & Co., dealers in Pig Iron, Detroit, Mich., report, under date of January 11, as follows: After what might be called a perfect rush in the Iron business, we have experienced in the Detroit market comparative quietness during the past week. We think that this must be occasioned by buyers being in the midst of their January inventory, and that perhaps some heavy buying may be done during the latter part of January, from the 15th or 20th on. Prices remain firm, with no changes whatever. We think that generally all of the weaker Charcoal-Iron dealers are stiffening, as they are beginning to realize that they ought to be getting better prices for their Iron than what were offered a while ago. There seems to be a slight break on the part of the Southern furnaces, but only very slight. We have learned of some pretty large sales having been made at prices a little off during the last of the year. There seems to be a great scarcity of Old Wheels and an active desire to buy. From \$19 to \$20 seems to be the price here. For present quotations we should quote the market about as follows:

Lake Superior Charcoal, Nos. 1, 2 and 3.	
Lake Superior Charcoal, Nos. 4, 5 and 6.	\$23.00 @ \$24.00
Lake Superior Coke, All Ore.	21.00 @ 22.00
Lake Superior Coke, Cinder Mixed.	19.50 @ 20.50
Standard Ohio Blackband.	21.00 @ 22.00
Southern No. 2.	19.00 @ 19.50
Southern Silvery, Open.	17.50 @ 18.00
Southern Silvery, Close.	17.00 @ 17.50
No. 1 Southern Mill.	17.00 @ 18.00
American Old Iron Rails.	23.00 @ 25.00
Old Wheels.	18.00 @ 20.00

Imports.

The following were the Imports of Hardware, Iron, Steel and Metals into the Port of New York for the week ending Jan. 12, 1886:

Hardware.	
Baker Hermann & Co.	Cutlery, hardware
Cutlery, hardware	Pig. tons, 300
Condon C. W.	Rods, pkgs, 855
Case, I.	Scammell Bros.
De la Vergne Mach Co.	Old car-wheels, 117
Broken cylinders, 2	Stetson Geo. W. & Co.
Erierson, Capt.	Pig. tons, 353
Sword, I.	Order.
Field Alfred & Co.	Rods, pkgs, 16,914
Mdse., cs, 5	Ore, tons, 260
Casks, 2	Coiled rods, 347
Folsom H. & D.	Tubes 147
Arms, cs, 19	Rods, bbls, 354
Fransse & Co.	Pig, tons, 60
Cases, 9	Crank-shaft, 1
Grace Cutlery Co.	Order.
Mdse., cs, 7	Order.
Gurney Fred. B.	Order.
Cases, 2	Order.
Lachian J. M.	Order.
Machinery, pcs., 48	Order.
Machinery, cs, 13	Order.
Chains, cs, 12	Order.
Lefevre Arms Co.	Order.
Mdse., cs, 3	Order.
Manfield B.	Order.
Casks, 10	Order.
Crabb W. & Co.	Order.
Wire, bbls, 40	Order.
Jackson R. D. & Co.	Order.
Tubes, cs, 18	Order.
Mayer, Strauss & Co.	Order.
Casks, 41	Order.
Naylor & Co.	Order.
Rods, bbls, 15,990	Order.
Sheets, cs, 109	Order.
Rods, pkgs, 14,429	Order.
Power C. W.	Order.
Cases, 7	Order.
Promer & Son.	Order.
Bundles, 40	Order.
Temple & Lockwood.	Order.
Cases, 17	Order.
Order.	Order.
Rods, bbls, 9835	Order.
Rail crop ends, kg., 250,000	Order.
Rail crop ends, tons, 370	Order.

Metals.	
Bruce & Cook.	Black taggers, bxs., 100
Meriden Britannia Co.	Mdse., cs, 5
Mestre Vincinte.	Copper, pkgs., 3
Panama & Co.	Copper ore, kg., 1,770,328
Phelps Dodge & Co.	Tin plates, bxs., 1,587
Order.	Tin plates, bxs., 414
Tin slabs, 3,913	

The imports of Cutlery, Metals and Hardware at this port during the week ended January 8 were as follows:

	Quantity.	Value.
Bismuth.	31	\$2,962
Brass goods.	31	1,740
Bronzes.	18	981
Clocks.	37	2,488
Copper.	27	1,230
Cutlery.	25	8,570
Dutch metal.	107	1,107
Guns.	80	9,103
Hardware.	1,241	1,481
Iron, pig. tons.	2,121	33,430
Iron, sheet, tons.	35	1,927
Iron, other, tons.	1,833	59,641
Lead, pigs.	1,000	3,411
Machinery.	10	5,940
Metal goods.	231	19,640
Nails.	1	45
Needles.	6	2,087
Old metal.	45	1,011
Plated ware.	12	1,256
Platina.	13	12,556
Pins.	18	1,803
Plumbago.	21	1,169
Quicksilver.	158	4,460
Saddlery.	3	1,230
Steel.	33,553	39,644
Spelter.	42,837	18,015
Tin, bxs.	1,121	6,748
Tin, 3,217 slabs.	324,310	67,641
Yarn.	2	182
Zinc oxide.	200	1,507
Zinc, b.	110,350	3,899

Exports.

The following list embraces the Exports of Hardware, Machinery, Iron, Metals, &c., from the port of New York, for the week ending January 12, 1886:

Ending January, 12, 1886:		Quan.	Val.
<i>Dutch West Indies.</i>			
Quan.	Val.	Pumps, pkgs.	14 2,263
Lamp goods,		Tacks, cs.,	6 45
pkgs.,	2 14	Tinfol, case,	1 1
Nails, kegs,	23 83	Car-wheels,	20 134
Clocks, case,	1 15	Scaves, cs.,	67 189
<i>Bremen.</i>			
		Hdw., pkgs.,	126 2,066
Hdw.,	22 535	Cutlery,	11 387
Saw, ma., cs.,	1 1	Knives, kegs,	235 661
Sews, case,	1 20	Tinware,	3 98
Tubing, case,	1 15	Clocks, pkgs.,	33 663
Clocks, case,	1 19	Locomotive,	1 4,400
<i>Porto Rico.</i>			
		Nails, kegs, <td>42 121</td>	42 121
Mf. iron, pkgs	22 1,210	Mf. iron, pkgs	7 33
Copper, cks.,	18 2,300	Tinware, pkgs	7 50
Nails, kegs,	50 140	Hdw., cs.,	21 199
Saw, ma., cs.,	87 14,000	<i>Mexico.</i>	
Copper, bars,	10 1,800	Hdw., pkgs.,	6 212
Cutlery, case,	1 15	Zinc, cs.,	21 24
Printing press,		Rifles, case,	1 17
pkgs.,	2 230	Nails, kegs,	4 134
Clocks, pkgs.,	149 3,469	Pumps, pkgs,	3 480
Hdw. pkgs,	128 3,013	Ag. imp., pkgs.,	2 36
Ag. imp., pkgs,	36 878	Mach'y, pkgs,	2 133
Mach'y, pkgs.,	12 315	Tin bxs.,	6 30
Pistols, case,	1 1,617	Per. caps, case,	1 49
<i>Rotterdam.</i>			
Copper, cakes	143 2,300	Mf. iron, pkgs	344 1,908
Hdw., case,	1 51	Cartridges, cs.	6 398
Copper, cks.,	538 72,000	Mach'y, pkgs,	12 3,914
		Cutlery, cs.,	142 2,075
<i>Liverpool.</i>			
		Car-wheels,	48 380

Trade Report.

General Hardware.

The year is referred to by both manufacturers and merchants as opening with decidedly better feeling and improved prospects. The volume of business is not large, but the indications point toward a satisfactory trade. A number of changes in price are occurring from week to week, and these in most instances are in the way of advance. This tendency is especially noticeable in lines that have been demoralized in price by excessive competition until they yielded little or no profit, and in Heavy Hardware, which feels the improvement in raw material. It is gratifying to note this tendency, but manufacturers will be wise if they are conservative in this matter, being careful only to announce such advances as are justified by the condition of the market. There is evidence of a disposition on the part of some to make advanced quotations prematurely, in anticipation of an improvement which they hope is coming, and with a view to give a better tone to the market. It will be well for such to bear in mind that any advance which is merely on paper, and which is not maintained during the coming months, will be an unwise move, the effect of which will ultimately be injurious to the market. Advances in price which are justified by the state of the market, and which will be maintained, are eminently desirable, and help the tendency toward better prices, but no good will come from announcing them if they are either fictitious or premature. Most of the advances which we have the pleasure of recording are unquestionably solid, and, if the present condition of things continues, will be maintained. But it is to the interest of all that there be no attempt on the part of manufacturers to make advanced quotations which will be merely nominal, and to which in the stress of competition they are not determined to adhere.

BARB WIRE.

Business is quiet, the natural outcome of the severe weather throughout the country. The market continues firm at the quotations, which remain 4.62½ cents for carload lots of Four-Foot Barb Wire, 4.75 cents for 3-ton lots and 5 cents for small lots. Quotations for the export trade have been advanced to 4.25 cents.

NAIIS.

The market is quiet, and, though low offerings have not entirely ceased, the great majority of the mills decline to sell at the prices which have been repeatedly made of late. The situation is intrinsically a sound one. We quote \$2.40 to \$2.50 for Iron Nails from store.

AXES.

The meeting of the manufacturers, to which we referred last week, did not succeed in carrying out the measures which were in contemplation, some unexpected difficulties having arisen. The result of the deliberations is not generally regarded by them as satisfactory, but a price was determined as the extreme limit beyond which Axes are not to be sold, which may perhaps strengthen the market. The price named, however, was lower than was desired by most of the makers, some of whom, indeed, refused to join in the movement for this reason. While considerable disappointment is expressed by many of the manufacturers at this issue of the conference, the Axe market may be referred to as being in an improved condition, and several of the manufacturers are quoting higher prices than heretofore and showing a disposition to maintain them. The very low prices at which the goods were sold, and the increased cost of manufacture, are referred to as necessitating such advances. The hope is expressed by some that the manufacturers may still at an early date be able to come to an agreement that will be satisfactory to all concerned, but the prospect for this is unfortunately not as good as it was a short time ago. In the meantime individual manufacturers will be wise in maintaining their prices and refusing to sell goods without profit. The disposition to do this is the most encouraging feature in the situation.

WIRE NAILS.

The manufacturers of Wire Nails met in this city yesterday and made an advance of 5 per cent. in their prices. They also adopted the following card of Standard Steel Wire Nails, which, it will be observed, gives the number to the pound for the different sizes, such number being 50 per cent. greater than that of the same sizes of Steel Cut Nails:

Cut Nails, No. to 1 lb.	Size.	Length.	Number to 1 lb.*	Price.
1,000	3d	1	1,500	\$5.50+
750	3d	1½	1,140	4.50+
Common				
800	3d	1	1,300	4.00+
480	3d	1½	720	2.25+
288	4d	1½	432	1.10+
200	5d	1½	300	1.10+
160	6d	2	160	.75+
124	7d	2½	124	.75+
96	8d	3	96	.35+
70	9d	3½	105	.35+
54	10d	4	87	.35+
44	12d	4½	65	.35+
34	14d	5½	51	.35+
24	16d	6½	35	.35+
18	20d	8½	27	.35+
10	24d	11	15	.35+
8	28d	13	13	.35+

* Gain in numbers over Cut Nails, 50 per cent.
+ Advances over Rate.

The trade will recognize the importance of the above action, which was very carefully considered and was taken with a view to securing uniformity in the Wire Nails furnished in competition with Cut Nails, and to put them on the same basis in order to facilitate their more general introduction. It will be seen that the names and lengths of the Cut Nails, with which the trade are familiar, have been followed, and that the standard for the Wire Nails has been made the length and the number to the pound. It will thus be seen that the gauge of the Nail is not specified, but will be determined by the length and number to the pound, the number being slightly modified by variations in the form of the head and point. But the number to the pound and the length are fixed by this card, the length being the same and the number being, as noted above, 50 per cent. advance on the Steel Cut Nails. The card rate of the Wire Nails will also be 50 per cent. advance on the card rate of the Steel Cut Nails, with the advances as printed above. In this way the Wire Nails are intended to be held, Nail for Nail, at the same price as the Steel Cut Nails. The advance in price which was made is referred to as justified by the advance which has taken place in Wire since the former price was determined at the manufacturers' meeting in November.

Of this meeting H. W. Hartman, of the Hartman Steel Co., was chairman; Charles Jones, of the Brooklyn Wire Nail Co., secretary, and George B. Germond, of the Russell & Erwin Mfg. Co., treasurer.

MISCELLANEOUS PRICES.

The Covert Mfg. Co., West Troy, N. Y., request us to call the attention of the trade to an error in their discount sheet, a copy of which we published in our last issue. Their price on New Lip Harness Snaps was named as discount 50 and 10 per cent., when it should have been discount 50 per cent., the correct figure, in which form the quotation is made in their revised discount sheets.

The Chapman Mfg. Co., Meriden, Conn., are selling Wooding's Improved Swiss Hame Chime, a description of which is given among our Hardware Novelties on page 29, at \$5, nickel-plated, and they propose to make before long a cheaper Hame Chime for work-horses, the price of which will be about \$2.50.

Gibbs Lawn Rake Co., Canton, Ohio, issue the following quotations on their Rakes and Post Hole Digger: The Gibbs Lawn Rake, per dozen, \$12, discount, 30 per cent.; Gibbs General Purpose Rake, common finish, per dozen, \$9; tinned, \$10; discount, 25 and 5. Gibbs Post Hole Digger, per dozen, \$30, discount, 30 per cent.

William Blair & Co., Chicago, Ill., issue a wholesale price current for Hardware and Tinners' stock, January 5, 1886. It is prefaced by the following remarks concerning the market:

The year opens with a bright prospect for commercial and industrial pursuits. Among the manufacturers of Hardware there has been a general "clearing of the decks" for action, by withdrawing former quotations, formulating new lists of prices, entering into combinations, and in some cases advancing prices. All this is preparatory to a general advance in prices, which is necessitated by the fact that many manufacturers have been doing business for the last year without a profit—and they are now confronted by an advance in raw material. In view of these facts we think there will be higher prices for the coming season, particularly on all lines of staple goods, and early purchases will prove most profitable. Iron Nails have been declining until quite recently. In view of the near approach of the spring trade and the prospects of a higher rate of freight, they are now firm, with an upward tendency, and sales are only made for immediate delivery. Steel Nails particularly will be scarce during the spring, owing to both a scarcity of material and the unsettled nailers' strike. The factory price of Barbed Wire is 4½¢ for Painted and 5½¢ for Galvanized in less than 50-ton lots. This price will be confirmed and possibly advanced at the next meeting of the manufacturers on the 14th of January. Our stock is complete in all lines for the spring trade. We shall continue to handle only the best quality of goods, and, having made all our purchases early, at low prices for cash, we are prepared to supply the wants of the trade promptly and on the most favorable terms. We solicit orders from our customers by mail. When goods are advancing it is not safe to hold orders for agents, as a few days may make a material difference in price, and we give these orders special attention, both as to prompt shipment and prices. Our agents will call upon you early with new goods and special prices.

The Southern White Lead Co., of St. Louis, under date of January 1, 1886, issue a circular and price list as follows:

Per pound.	Per 50 pounds.
Southern Co. Strictly Pure White Lead in kegs, 500 pounds and over.....	6½¢
Southern Co. Dry White Lead in kegs, 500 pounds and over.....	6¼¢
Southern Co. Red Lead in kegs, 500 pounds and over.....	6½¢
Southern Co. Litharge in kegs, 500 pounds and over.....	6½¢

Rebates for the Year's Business: To buyers of 5 tons and less than 10 tons, during the year 1886, a rebate of 2 per cent.; to buyers of 10 tons and less than 25 tons, during the year 1886, a rebate of 3 per cent.; to buyers of 25 tons and over, during the year 1886, a rebate of 5 per cent.

The advance in Screws, which we announced last week, is general, being adopted by all the leading manufacturers. It is thought that the price will be maintained by the makers. The Philadelphia Screw Co. request us to state that they have changed their discounts so as to conform to the late advance.

George Chase, 107th street and First ave., New York; F. E. Dishman, New

Albany, Ind., and J. J. Sutton, Hot Springs, Ark., issue a joint circular in which they inform the trade that during the past year they had the entire production of Washita Stone from the quarries of J. J. Sutton, near Hot Springs, Ark., and that they will continue to have control of that Stone. Referring then to the quality of Washita Stone, and giving the prices which they announce to the trade, they say:

For several years the Oil-Stone business has been greatly demoralized by the sale of large quantities of very poor quality of Washita Stone, and most sales were made on price only, and the quality of the Stone was not considered. Mechanics know there is no other Whetstone so good as a good Washita Oil Stone, but in the last few years many were unable to buy good genuine Washita Stones from the dealers, and they were forced to buy Turkey and other kinds of Stones. Large quantities of Washita Stones have been sold to dealers that have serious defects, such as sand-holes, hard spots, hard streaks and other imperfections, but they were doctored by bleaching acids, thoroughly dried and then polished with plaster of paris, so as to hide the defects to the inexperienced. We will here state that all pure and good Washita Stone is white, but not all the Washita Stone that appears white is good. In the last year we have cut none but Sutton's best Stone, and have not tried to push sales. But others, who, having had this stone, have sold out their stocks to parties who now canvass the country and take orders for good Washita Stone at lower prices than we quote, cannot fill them. We do not send out any canvassers, nor place any Stone on commission. We now control the entire production of good Washita Stone, and, as the genuine article cannot be manufactured at the prices for which worthless, bogus Stone has been lately sold, we quote the following as our prices for the present:

Washita Stone, No. 1, extra..... per lb., 25 cents.
Washita Stone, No. 1..... per lb., 20 cents.
Washita Stone, No. 2..... per lb., 16 cents.
Washita Slips, No. 1, extra..... per lb., 50 cents.
Washita Slips, No. 1..... per lb., 40 cents.

Richardson Bros., Newark, N. J., manufacturers of Saws, issue, January 1, a supplement to their list of August 1, 1884, in which they describe the new goods they have recently added to their line, to which we shall refer again. They also issue the following revised discount sheet:

Pages 7 to 13, inclusive..... 45¢ to 10¢
Page 14..... 30¢
Page 15..... 30¢
Pages 16 to 24, inclusive..... 45¢ to 10¢
Page 25..... 25¢
Page 26 to 54 inclusive..... 25¢ to 5¢
Page 55, Band Saw..... 30¢
Pages 56 to 71, inclusive..... 35¢ to 5¢
Page 71, Saw Frames..... 25¢
Pages 72 to 73..... 25¢ to 5¢
Pages 74, 77, 78, 79 and 80..... 45¢ to 10¢
Page 81..... 15¢
Page 82..... 15¢

At a meeting of the manufacturers of Stebbins' Molasses Gates an advance of about 10 per cent. was made. In this action Sargent & Co., Landers, Frary & Clark and the Perin & Gaff Mfg. Co. united.

It is difficult to place orders for Chain at figures which have recently prevailed, and slightly advanced quotations are made by several manufacturers.

There are indications of improvement in the market for Chisels, and some of the manufacturers who have been quoting low figures are withdrawing their quotations, and in some cases naming higher prices.

Without any concerted action among the manufacturers there is a decided improvement in the price of Cast Butts, and the goods cannot be purchased at as low figures as a short time ago. Casters also are held more firmly and at slightly advanced prices.

HAMMERS.

The Buffalo Hammer Co., Buffalo, N. Y., at the close of their new catalogue, to which we alluded in our last issue, give the following comparative list of their Hammers, as compared with those of other leading makers:

Kind.	Buffalo Hammer Co.	Maydole & Co.	Verkes & Plumb.	C. Hammond & Son.	Alba Tool Co.
A. E. Nail.....	No. 1	No. 1	No. 1	No. 1	No. 1
A. E. Nail.....	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
A. E. Nail.....	2	2	2	2	2
A. E. Nail.....	3	3	3	3	3
A. E. Nail.....	4	4	4	4	4
A. E. Nail.....	5	5	5	5	5
A. E. Nail.....	6	6	6	6	6
A. E. Nail.....	7	7	7	7	7
A. E. Nail.....	8	8	8	8	8
A. E. Nail.....	9	9	9	9	9
A. E. Nail.....	10	10	10	10	10
A. E. Nail.....	11	11	11	11	11
A. E. Nail.....	12	12	12	12	12
A. E. Nail.....	13	13	13	13	13
A. E. Nail.....	14	14	14	14	14
A. E. Nail.....	15	15	15	15	15
A. E. Nail.....	16	16	16	16	16
A. E. Nail.....	17	17	17	17	17
A. E. Nail.....	18	18	18	18	18
A. E. Nail.....	19	19	19	19	19
A. E. Nail.....	20	20	20	20	20
A. E. Nail.....	21	21	21	21	21
A. E. Nail.....	22	22	22	22	22
A. E. Nail.....	23	23	23	23	23
A. E. Nail.....	24	24	24	24	24
A. E. Nail.....	25	25	25	25	25
A. E. Nail.....	26	26	26	26	26
A. E. Nail.....	27	27	27	27	27
A. E. Nail.....	28	28	28	28	28
A. E. Nail.....	29	29	29	29	29
A. E. Nail.....	30	30	30	30	30
A. E. Nail.....	31	31	31	31	31
A. E. Nail.....	32	32	32	32	32
A. E. Nail.....	33	33	33	33	33
A. E. Nail.....	34	34	34	34	34
A. E. Nail.....	35	35	35	35	35
A. E. Nail.....	36	36	36	36	36
A. E. Nail.....	37	37	37	37	37
A. E. Nail.....	38	38	38	38	38
A. E. Nail.....	39	39	39	39	39
A. E. Nail.....	40	40	40	40	40
A. E. Nail.....	41	41	41	41	41
A. E. Nail.....	42	42	42	42	42
A. E. Nail.....	43	43	43	43	43
A. E. Nail.....	44	44	44	44	44
A. E. Nail.....	45	45	45	45	45
A. E. Nail.....	46	46	46	46	46
A. E. Nail.....	47	47	47	47	47
A. E. Nail.....	48	48	48	48	48
A. E. Nail.....	49	49	49	49	49
A. E. Nail.....	50	50	50	50	50
A. E. Nail.....	51	51	51	51	51
A. E. Nail.....	52	52	52	52	52
A. E. Nail.....	53	53	53	53	53
A. E. Nail.....	54	54	54	54	54
A. E. Nail.....	55	55	55	55	55
A. E. Nail.....	56	56	56	56	56
A. E. Nail.....	57	57	57	57	57
A. E. Nail.....	58	58	58	58	58
A. E. Nail.....	59	59	59	59	59
A. E. Nail.....	60	60	60	60	60
A. E. Nail.....	61	61	61	61	61
A. E. Nail.....	62	62	62	62	62
A. E. Nail.....	63	63	63	63	63
A. E. Nail.....	64	64	64	64	64
A. E. Nail.....	65	65	65	65	65
A. E. Nail.....	66	66	66	66	66
A. E. Nail.....	67	67	67	67	67
A. E. Nail.....	68	68	68	68	68
A. E. Nail.....	69	69	69	69	69
A. E. Nail.....	70	70	70	70	70
A. E. Nail.....	71	71	71	71	71
A. E. Nail.....	72	72	72	72	72
A. E. Nail.....	73	73	73	73	73
A. E. Nail.....	74	74	74	74	74
A. E. Nail.....	75	75	75	75	75
A. E. Nail.....	76	76	76	76	76
A. E. Nail.....	77	77	77	77	77
A. E. Nail.....	78	78	78	78	78
A. E. Nail.....	79	79	79	79	79
A. E. Nail.....	80	80	80	80	80
A. E. Nail.....	81	81	81	81	81
A. E. Nail.....	82	82	82	82	82
A. E. Nail.....	83	83	83	83	83
A. E. Nail.....	84	84	84	84	84
A. E. Nail.....	85	85	85	85	85
A. E. Nail.....	86	86	86	86	86
A. E. Nail.....	87	87	87	87	87
A. E. Nail.....	88	88	88	88	88
A. E. Nail.....	89	89	89	89	89
A. E. Nail.....	90	90	90	90	90
A. E. Nail.....	91	91	91	91	91
A. E. Nail.....	92	92	92	92	92
A. E. Nail.....	93	93	93	93	93
A. E. Nail.....	94	94	94	94	94
A. E. Nail.....	95	95	95	95	95
A. E. Nail.....	96	96	96	96	96
A. E. Nail.....	97	97	97	97	97
A. E. Nail.....	98	98	98	98	98
A. E. Nail.....	99	99	99	99	99
A. E. Nail.....	100	100	100	100	100

JOHN CHATILLON & SONS,
91 Cliff street, New York, announce that about the 15th inst. they hope to have their

new illustrated catalogue ready for distribution. In the meantime they issue the revised price list which we give below, from which it will be seen that they divide their goods into four classes, A, B, C and D. Class A includes the following goods, from the prices of which there is a discount of 50 per cent:

Light Spring Balances, Per doz.
No. 20, with Hooks..... \$1.50
No. 30, with Hooks..... 1.00
No. 40, with Hooks..... .80
No. 50, with Hooks..... .60
No. 60, with Hooks..... .40
No. 70, with Hooks..... .30
No. 80, with Hooks..... .20
No. 90, with Hooks..... .10
No. 100, with Hooks..... .05
No. 110, with Hooks..... .02
No. 120, with Hooks..... .01

Round Spring Balances, Per doz.
No. 10, with Hooks..... \$4.00
No. 20, with Hooks..... 2.00
No. 30, with Hooks..... 1.00
No. 40, with Hooks..... .50
No. 50, with Hooks..... .25
No. 60, with Hooks..... .10
No. 70, with Hooks..... .05
No. 80, with Hooks..... .02
No. 90, with Hooks..... .01

Straight Spring Balances, Per doz.
With Hooks.
No. 30½..... \$2.00
No. 40..... 1.00
No. 50..... .50
No. 60..... .25
No. 70..... .10
No. 80..... .05
No. 90..... .02
No. 100..... .01

With Square Pans, Per doz.
No. 32½..... \$2.00
No. 42..... 1.00
No. 52..... .50
No. 62..... .25
No. 72..... .10
No. 82..... .05
No. 92..... .02
No. 102..... .01

With Round Pans, Per doz.
No. 31½..... \$2.00
No. 41..... 1.00
No. 51..... .50
No. 61..... .25
No. 71..... .10
No. 81..... .05
No. 91..... .02
No. 101..... .01

With Scoops, Per doz.
No. 33½..... \$2.00
No. 43..... 1.00
No. 53..... .50
No. 63..... .25
No. 73..... .10
No. 83..... .05
No. 93..... .02
No. 103..... .01

Class B includes the following goods, which are subject to a discount of 50 and 20 per cent:

Ice Balances, Per doz.
No. 110, Tubular..... \$180.00
No. 120, Tubular..... 210.00
No. 130, Ironclad..... 60.00
No. 140, Ironclad..... 72.00
No. 150, Ironclad..... 84.00

Class C includes the following goods, which are subject to a discount of 60 per cent:

Circular Family Scales, Per doz.
No. 230, with Hooks..... \$39.00
No. 240, with Hooks..... 42.00
No. 250, with Hooks..... 45.

full polished top and bottom, bronzed set and heel, extra light weight, the list being \$12.

The Hawkeye Steel Barb Fence Co., Burlington, Iowa, in their illustrated annual for 1886, in connection with a description of their manufactures, gave a variety of interesting matter.

O. Lindemann & Co., 254 Pearl street, New York, issue their 1886 catalogue of Bird Cages, which is to take the place of all previous issues. It illustrates a large variety of styles of these goods, together with Parrot Stands, Bathing Cages, Wood Cages, &c., Revolving Perch Aviaries, Traveling Cages, Cage Brackets and miscellaneous fixtures to be used in connection with Bird Cages.

The Cleveland Rolling Mill Co., Cleveland, Ohio, whose New York office is 23 Astor House, Clarence Dickerson, agent, send out to their customers a Paper Cutter containing the Wire price list and calendar for the year.

Fraser & Co., 62 Chatham street, New York, having been appointed agents for the sale of Charles P. Fay's Patent Spring Calipers and Dividers, issue a descriptive list of the same, illustrating the goods and mentioning some of the points wherein they are claimed superior to others. They also allude to Stubbs' Files, Tools and Steel, Grobet Swiss Files, Chesterman's Tapes and Rules, as other lines which they are carrying.

The American Cutlery Co., of Chicago, issue a circular, December 31, 1885: "Owing to recent advances in the price of steel and other materials, we are compelled to withdraw all prices for the present." They intimate that, while it is a flattering testimonial to the reputation and popularity of their patterns to have competitors copy their styles, they are compelled to offer for the coming season new and elegant patterns.

The HP Nail Co., Cleveland, Ohio, finding their recently erected buildings insufficient for their purposes, are enlarging in such a way as to give them a considerably increased capacity.

The Hatch Brothers Co., Bridgeport, Conn., are reported to be manufacturing a new line of Pocket Cutlery, which they are about to introduce to the trade.

The Ohio Clip Works, Westville, Ohio, issue a price list of Baker Clips, Baker Oval Lap Rings, Baker Lap Links, Neck Yoke Irons, Ferrules, Hooks, &c., of their manufacture. Since the Baker Clip was put on the market, two years ago, it is referred to as having met satisfactory sale, and the company are preparing to largely increase their production during the coming year.

The partnership doing business under the name of George A. Ohl & Co., and composed of George A. Ohl, John P. Hauschild and Henry Binnse, having been dissolved by limitation, the two latter gentlemen will liquidate for the firm and will transact business at the old stand, as manufacturers of Machine Tools, under the style of the Newark Machine Tool Works, East Newark, N. J.

We call attention to the advertisement on page 30 of the Walkley Hardware Co., Plantsville, Conn., who are making a specialty of their Steel Carpet Tacks, which they manufacture under their trade-mark labels of Diamond and Circle brands, the former being put up in uniform weights and the latter in double uniform weights. This method of putting up these goods is referred to as having proved very popular with the retail trade, as it gives them all sizes from 6 to 16 ounces at a uniform price. The company call especial attention to the quality and finish of their Tacks, and invite a comparison with the best goods in the market. They are also manufacturing a full line of all goods on the Hardware list. For the convenience of their customers they issue in a neat pamphlet form the list prices, with a discount sheet giving the same discounts as are announced by the Associated Tack Manufacturers, but this company, our readers will remember, are outside of the combination.

The Medford Fancy Goods Co., whose removal to 707 Broadway, New York, is referred to in their announcement on page 30, manufacturers of Dog and Cat Collars and general Dog Furnishings, issue their 1886 catalogue, bearing date January 1. This catalogue, with the large variety of these goods which are illustrated in it, is an evidence of the enterprise of the company, and indicates the position which they have attained in this line. An examination of its pages shows that new patterns and styles are constantly being introduced, and our readers will find in it many which have not previously been represented. But, as referring more specifically to this line of goods, we take pleasure in making the following extract from the company's introductory circular to the trade:

The demand for Dog Collars and Furnishings of a better quality than is usually carried by the average dealer is rapidly increasing. The Dog Shows that have been held in various parts of the United States have awakened an interest among the greater part of the American public in the dog, and at the same time it has stirred a spirit of rivalry among them, each desiring to have a dog that is handsomer and of a better breed than his neighbors. In former years the dog was simply kept in the house or store as a sort of watchman or burglar alarm, but since the introduction of electricity it has taken his place, and the dog is now kept by most families as a pet or an adornment, and, in consequence, as the value of the dog has increased, so has the demand for handsome and expensive Collars, Harness, &c. Where the com-

mon strap collar formerly filled all wants, now the handsomest and best manufacture is demanded. Being the only exclusive manufacturers of this class of goods in the world, we claim that we are capable of supplying the demands of the public and furnishing the trade with the latest and best selling designs. Owing to the fact that we are constantly inventing new designs, our catalogue does not contain a description of the full line that we manufacture, and when you are ordering goods from our catalogue kindly state how many samples of new goods that are not illustrated we may have the privilege of sending you.

The Rhode Island Horse Shoe Co., Providence, R. I., issue the following circular to the trade, announcing a renumbering of their Perkins Toe Calks, which will promote the convenience of the trade:

At the request of the trade we have this day renumbered our Perkins Toe Calks, so that our medium length now corresponds not only in length, but in numbers, to that of other makes. We would suggest, therefore, that you renumber your stock. The old numbers were 0, 1, 2, 3, 4, 5. The new numbers are 0, 1, 2, 3, 4, 5, 6. The No. 00 you now have in stock should be marked No. 0, the No. 0 marked No. 1, and so on. This change applies on all lengths, viz: Short, medium and long. We shall continue to hold the smallest size (new No. 0) at 1/2 cent advance over the other sizes, as heretofore.

The Ireland Mfg. Co., Cincinnati, Ohio, advise us that they have appointed W. H. Jacobus & Co., 90 Chambers street, New York, Eastern agents for the goods formerly made by the Morris Sash Lock Co., and now made by them.

Announcement is made that C. W. Boynton, recently of the E. M. Boynton Saw and File Co., is no longer connected with the company.

Bolmes & Coffin, whose card will be found on page 16, have established their headquarters at 104 Chambers street, New York, where will also be the office of Wm. Mann, Jr., & Co., manufacturers of Axes and Edge Tools, for whom they are agents.

E. S. Hulbert & Co., Bernardston, Mass., request us to announce to the trade that they have made arrangements with the T. G. Conway Co., 20 Warren street, New York, to be their sole selling agents, who will quote their Cutlery at factory prices. Shipments of goods can be made either from factory or from this city, at the convenience of the purchaser. They also call attention to the reduction in the list prices on 5/8, 6, 6 1/2 and 7 inch Butcher Knives, and state that they have also added several styles not on their 1885 list.

Our readers will observe the Special Notice on page 18, in which attention is called to an opportunity for a good business man—a mechanical engineer, with capital—to become identified with a well-known manufacturing concern. Full particulars in regard to the matter may be obtained by addressing them.

The copartnerships heretofore existing between Robert Roger Haydock and William T. Leggett, under the firm name of Robert R. Haydock & Co., 75 Murray street, New York, and between Eugene Bissell and M. M. Bissell, under the firm name of E. Bissell & Co., were dissolved December 31 by mutual consent. Announcement is also made that Robert R. Haydock and Eugene Bissell formed, January 1, a copartnership for the transaction of an Auctioneer and Commission business, and in consideration of the dates of the establishment of their former houses, the former in 1832 and the latter in 1863, have adopted the firm name of Haydock & Bissell, whose place of business as Auctioneers and Commission Merchants will be 83 Chambers street and 65 Reade street, New York. Relating to this announcement Haydock & Bissell, in their circular, January 1, say:

In concentrating the business of the two oldest representative houses in our respective lines, we wish to announce that the trade sales of Earthenware, China, Glassware and Fancy Goods will remain under the personal supervision of Robert R. Haydock, of the late firm Robert R. Haydock & Co., and those of Hardware, Cutlery, Stamped Ware and House Furnishing Goods under that of Eugene Bissell, of the late firm E. Bissell & Co.

THE NIMICK & BRITTON MFG. CO., Pittsburgh, Pa., issue a revised price list of Door Locks, Knobs, Escutcheons, Burglar Proof Locks, Padlocks, &c. Their discount sheet No. 7 is as follows, in which it will be observed that Padlocks are quoted at discount 70 per cent., there being, it will be remembered, a further cash discount of 2 per cent., which applies to the whole:

Door Locks, Knobs, Latches, Keys, Escutcheons, Sash Locks and Bell Pulls..... 50
Padlocks and Padlock Keys..... 70
Butts, Genuine Bronze..... 60
Butts, Egyptian Bronze..... 70
Butts, Bronze Plated..... 70
Lever Bell Pulls..... 50
Store Door Handles, Locks and Latches..... 50
Shutter Hinges and Flaps, Genuine Bronze..... 50
Shutter Hinges and Flaps, Bronze Plated and Egyptian..... 50
Shutter Knobs, Genuine Bronze..... 50
Shutter Knobs, Bronze Plated and Egyptian..... 50
Shutter Bars, Genuine Bronze..... 50
Shutter Bars, Bronze Plated and Egyptian..... 50
Sash Lifts, Genuine Bronze..... 50
Sash Lifts, Bronze Plated and Egyptian..... 50
Scales..... 50
Drawer Pulls, Genuine Bronze..... 50
Drawer Pulls, Egyptian Bronze and Bronze Plated..... 70
Push Plates, Genuine Bronze..... 50
Scales..... 50
Barn Door Locks..... 30

It is also announced that on all purchases of Locks, Knobs, Latches, Escutcheons and

Bell Pulls amounting to \$500, net, during the season ending June 30, 1886, a special quantity discount of 5 per cent. will be allowed, and that on all purchases of 50 dozen Padlocks at one time a special discount of 5 per cent. will be allowed.

THE PECK, STOW & WILCOX CO.,

New York and Southington, Conn., are about issuing, under date January 1, 1886, their discount sheet No. 3, which applies to their catalogue of 1885. This discount sheet, like other former issues, covers Tinners' Tools and Machines, Tinners' Hardware, General Hardware and Carriage and Saddlery Hardware. The special goods in Class A, which are marked A in the discount sheet, are subject only to a cash discount of 2 per cent. beyond the prices given, and all goods not enumerated in Class A are subject to an additional cash discount of 10 per cent. beyond the price given:

	Discount
Tinners' Tools and Machines.	Per cent.
Stow's Patent Folders.....	A net
Grooving Machines.....	A net
Stow's Patent Encased Machines.....	A net
Raymond's Patent Machines.....	A net
Stow's Patent Machines.....	A net
Power Machines.....	A net
Moore's Double Seamers.....	A net
Stow's Double Seamers.....	A net
Olmsted's Double Seamers.....	A net
Stow's Double Seamers.....	A net
Hulbert's Double Seamers.....	A net
Reading Machines.....	A net
Crimping Machines.....	A net
Stove Pipe Formers, Nos. 1, 2.....	A net
Tin Pipe Formers, Nos. 1, 2.....	A net
Nos. 0, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.....	A net
Stow's Improved Formers.....	A net
Square Box and Can-Top Folders.....	A net
Forming Machines.....	A net
Sheet-Iron Folding Machines.....	A net
Patent and Improved Gutter Machines.....	A net
Gutter Machines and Gutter Rods.....	A net
Squaring Shears.....	A net
Circular Shears.....	A net
Sawing Machines.....	A net
Waugh's Circular Shears.....	A net
Shear and Punch.....	A net
Tinners' Shears and Snips.....	A net
Shear Holder and Patent Gauge.....	A net
Hammers.....	A net
Set Tinners' Tools.....	A net
Wrought Stakes.....	A net
Bright and Cast Stakes.....	A net
Swedish Stakes.....	A net
Square Pan Machines.....	A net
Solid Punches.....	A net
Hollow Punches.....	A net
Sheet-Iron and Chisels.....	A net
Hand Groovers.....	A net
Tinners' Awns and Cutting Nipper.....	A net
Tinners' Mallets.....	A net
Cornice Brake.....	A net
Sanding Tools.....	A net
Bell's Roofing Engine.....	A net
Roofing Double Seamers.....	A net
Tinners' Presses.....	A net
Sundry Machines and Parts.....	A net

Tinners' Hardware.	
Coffee Mills.....	A 45¢
Candle Sticks and Flue Stops.....	A 25
American Snuffers.....	No goods
Plumbers' Tools.....	A 25
Paste Jaggies.....	A 25
Coppers and Copper Handles.....	A 25
Plumbers' Ladders.....	A 25
Wire Gauges.....	A 15¢
Fire Pots.....	A 30
Malleable Kettle Ears.....	A 30
Kettle and Tea Kettle Ears.....	A 30
Malleable Ears and Clips.....	A 30
Malleable Ears and Clips.....	A 30
Saucer Pan Handles.....	A 30
Teapot Handles.....	A 30
Waffle Iron and Coffee Roasters.....	A 10
Toy Sad Iron Stands.....	A 30
Coffee Pot Stands.....	A 30
Coffee Pot Stands.....	A 30
Stove Cover Lifters.....	A 30
Stove Pokers.....	A 30
Coal Tongs.....	A 30
Coal Shovels.....	A 30
Shovel and Tongs Stands.....	A 30
Fire Sets.....	A 30
Fire and Kitchen Sets.....	A 30
Calipers and Compasses.....	A 30
Iron Fire Dogs.....	A 30
Brass Andirons and Fenders.....	A 30
Umbrella Stands.....	A 30
Match Plates and Safes.....	A 30
Book Racks.....	A 30
Stove Bolts.....	A 30

General Hardware.	
Mechanics' Wrenches.....	A 60
Machinists' Wrenches.....	A 60
Agricultural Wrenches.....	A 60
Shepard's Wrenches.....	A 60
Coe's Malleable Wrenches.....	A 60
No. 1, Plain, per doz.....	A 70
No. 2, Polished, per doz.....	A 70
No. 3, Nickel-plated, per doz.....	A 70
6 inches.....	A 70
No. 5, Plain, per doz.....	A 70
No. 6, Polished, per doz.....	A 70
No. 6, Nickel-plated, per doz.....	A 70
Steel and Iron Squares.....	A 50
Wing Dividers.....	A 50
Calipers and Compasses.....	A 50
Flat and Round-nosed Pliers.....	A 50
Carpenter's Pincers.....	A 50
Add 6 inch, per doz.....	A 50
Socket Firmers Chisels, No. 1 Extra.....	A 70
Socket Firmers Chisels, No. 1.....	A 70
Socket Framing Chisels.....	A 70
Socket Corner Chisels.....	A 70
Carpenter's Slicks.....	A 70
Socket Framing Mill Chisels.....	A 70
Socket Framing Mill Chisels.....	A 70
Socket Paring Chisels.....	A 70
Extra Tanged Firmers Chisels.....	A 70
Extra Tanged Firmers Chisels.....	A 70
Socket Firmers Gouges.....	A 70
Socket Firmers Gouges.....	A 70
Socket Firmers Paring Gouges.....	A 70
Drawing Knives.....	A 70
Handles.....	A 70
Ratchets and Boys' Axes.....	A 25
Butcher's Cleavers.....	A 30
Corn Hooks.....	A 30
Cast Hatchets.....	A 30
Steak Hatchets.....	A 30
Nail Hammers.....	A 30
Tack Hammers.....	A 30
Nantucket Drivers.....	A 30
Carpet Stretchers and Tack Claws.....	A 30
Shoe Hammer.....	A 30
Peck's Patent Bees.....	A 40
Bit Braces.....	A 50
Saw Rods.....	A 30
Saw Sets.....	A 30
Cheese and Butter Triers.....	A 30
Screw Drivers.....	A 30
Box Scrapers and Chisels.....	A 30
Chisel Heads.....	A 30
Hox and Cotton Hooks.....	A 30
Calipers and Compasses.....	A 30
Geared Breast Drills.....	A 30
No. 4 Nickel-Plated Drill.....	A 30
Ratchet and Blacksmith's Drills.....	A 30
Blacksmith's Shoeing Pliers.....	A 30
Blacksmith's Butcher's.....	A 30
No. 12 Farmers' Hammers.....	A 30
Steel Traps.....	A 30
Wagon Jacks and Jack Screws.....	A 30
Benck Screws and Door Clamps.....	A 30
Quick Frame and Cabinet Clamps.....	A 30
Carriage-makers' Clamps.....	A 30
Ice Picks and Ice Axe and Picks.....	A 30
Scratch Awns.....	A 30
Steelyards.....	A 30
Scale Beams.....	A 30
Spring Balances.....	A 30
Tea and Counter Scales.....	A 30
Dixon's Meat Cutters.....	A 30
Hale's Meat Cutters.....	A 30
Meat Cutters and Stuffers.....	A 30
Cherry Seeders.....	A 30
Apple Parers.....	No goods
Tobacco Cutters.....	A 30

Door Bells—change list.	
Nos.....	905 910 915
Change list, No. 0560 to \$1.65.....	\$8.50 10.00 12.00
Add No. 07 Bell Lever, per doz.....	\$2.15
Change list, No. 0560 to \$1.65.....	
Door Bells and Levers.....	A 30
Door Bells.....	A 30
Alarm Door Bells.....	A 30
House Bells on Carriages.....	A 30
Slide Bell Pulls.....	A 30
Sash Cranks, Square Neck Bolts.....	A 30
Bell Cranks, Spikes and Springs.....	A 30
Hand Bells.....	A 30
Call Bells.....	A 30
Hush Bolts.....	A 30
Wrought Front Door Bolts.....	A 30
Chain Door Fasteners.....	A 30
Chain Door Bolts.....	A 30
Bottom Bolts.....	A 30
Spring Foot Bolts.....	A 30
Door Spring and Square Cased Bolts.....	A 30
Nos. 415 and 417, Wrought Spring Bolts.....	A 30
No. 503, Cast Spring Bolts.....	A 30
Wrought Iron Square Bolts.....	A 30
Cast Brass Square Spring Bolts.....	A 30
Cast Brass Square Neck Bolts.....	A 30
No. 425, Wrought Square-Necked Bolts.....	A 30
No. 504, Cast Square-Necked Bolts.....	A 30
Barrel Bolts.....	A 30
Nos. 505, 506, Cast Barrel Bolts.....	A 30
Wrought Barrel Bolts.....	A 30
Cast Brass Barrel Bolts.....	A 30
Iron Knob Tower Bolts.....	A 30
No. 502, Flat Shutter Bolts.....	A 30
No. 345, Lever Bolts.....	A 30
Jammed Staples.....	A 30
Flat Ship Bolts.....	A 30
Straight Cupboard Bolts.....	A 30
Flat Cupboard Bolts.....	A 30
Brass Show Case Bolts.....	A 30
Flush Cupboard Catches.....	A 30
Brass Flush Cupboard Catches.....	A 30
Cupboard Latches.....	A 30
Cupboard Catches.....	A 30
Cupboard Turns.....	A 30
Screen-Door Catches.....	A 30
Door Buttons.....	A 30
Sash Fasteners.....	A 30
Sash Fasteners and Window Casters.....	A 30
Shutter Bars.....	A 30
Sash Lifts.....	A 30
Sash Lifts.....	A 30
Sash Lifts and Locks.....	A 30
Shutter Screws.....	A 30
Shutter Screws.....	A 30
Shutter Springs.....	A 30
Nos.....	110 115 120 137
Per gross.....	\$1.75 1.75 2.25 3.75
Window Spring Bolts and Sockets.....	A 30
Window Springs.....	A 30
Add Window Springs.....	A 30
No. 27 Brass Bolt, per gross.....	A 30
No. 29 Iron Bolt, per gross.....	A 30
Sash Cord Irons, Centers and Props.....	A 30
Trunk and Sash Rollers.....	A 30
Trunk and Sash Rollers.....	A 30
Hay Fork Pulleys.....	A 30
Screw and Side Pulleys.....	A 30
Upright and Yard Line Pulleys.....	A 30
Add Yard Line Pulleys.....	A 30
No. 225, Japanned, inches.....	A 30
Per doz.....	\$0.80 1.10
No. 230, Galvanized, inches.....	A 30
Per doz.....	\$1.40 1.75

Clothes Line Pulleys.	
Hot House and Awning Pulleys.....	A 30
Sliding Shutter Sheaves.....	A 30
Encased Swivel Pulleys.....	A 30
Well Wheels and Hooks.....	A 30
Drawer Pulleys.....	A 30
Card Frames.....	A 30
Cast Brass Flush Rings.....	A 30
Pendant Drawer Pulleys.....	A 30
Drawer and Lifting Handles.....	A 30
Cast Brass Lifting Handles.....	A 30
Japanned Lifting Handles.....	A 30
Chest Handles.....	A 30
French Window Shutter Handles.....	A 30
Door Knobs.....	A 30
Escutcheons.....	A 30
Letter Box Plates.....	A 30
Store Door Handles.....	A 30
Store Door Handles.....	A 30
Barn Door Latches.....	A 30
Add Cottage Latch, No. 29, per doz.....	\$1.00
Thumb Latches.....	A 30
Door Pulls.....	A 30
Hot and Cold Water Cocks.....	A 30
Add Hot and Cold Cocks with Wrought Screw.....	A 30
No. 33 Japanned, per gross.....	A 30
No. 133 Coppered, per gross.....	A 30
Wardrobe Hooks.....	A 30
School House Hooks.....	A 30
Grindstone Flanges.....	A 30
Clothes Line Hooks.....	A 30
Harness Hooks.....	A 30
Chandelier and Ceiling Hooks.....	A 30
Lamp and Ceiling Hooks.....	A 30
Drive and Screw Hooks.....	A 30
Molding and Mirror Hooks.....	A 30
Cup Hooks.....	A 30
Hammock Hooks.....	A 30
Bird Cage Hooks.....	A 30
Castors.....	A 30
Bed Keys.....	A 30
Bedstead Fastenings.....	A 30
Ox Bow Pins.....	A 30
Cattle Leaders and Bull Rings.....	A 30
Ox Bails.....	A 30
Plumb Bobs.....	A 30
Hitching Rings.....	A 30
Hog Scrapers.....	A 30
Grindstone Flanges.....	A 30
Nut Crackers.....	A 30
Garden Forks and Trowels.....	A 30
Boot Jacks and Foot Scrapers.....	A 30
Kitchen Grindstones.....	A 30
Grindstone Flanges.....	A 30
Strap and T Hinges.....	A 30
Hinge Hasps.....	A 30
Hook and Plate Hinges.....	A 30
Wrought Butts and Hinges.....	A 30
Spring Hinges.....	A 30
Loose Pin Butts, p. 534.....	A 30
Loose Pin Butts, p. 535.....	A 30
Blind Hinges.....	A 30
Hinges and Latch Latches.....	A 30
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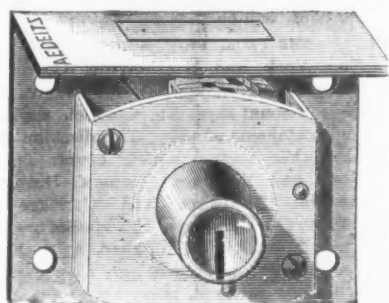
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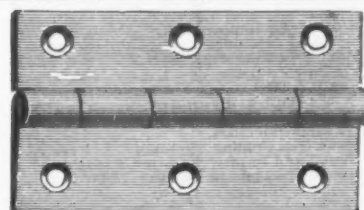


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No Cross Joints, Un-
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Clings well to the Pulley.
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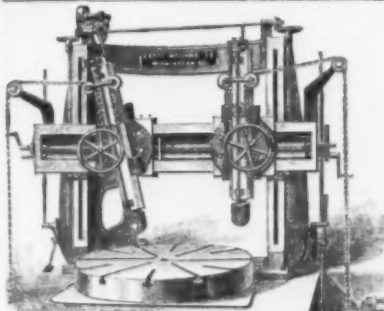
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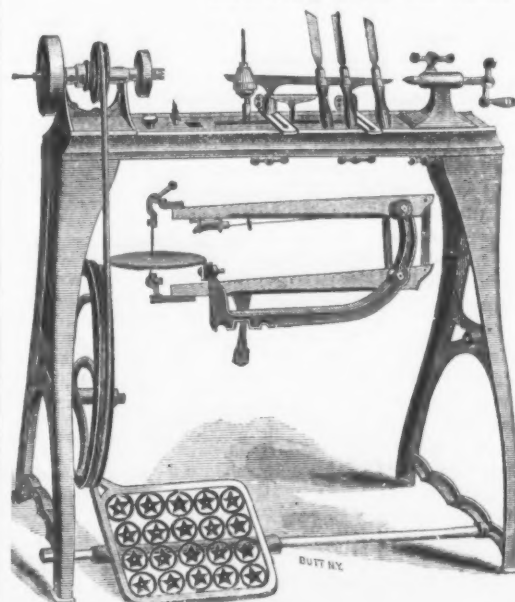
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SUPPLIES for the coming year.



It is by far the best Lathe in
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WALPOLE EMERY MILLS,
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THE WEEK.

Mr. McPherson of New Jersey, last week made a strong argument in Congress against silver coinage. He said that if coinage were now suspended silver might be got to a proper relation with gold; and, in the opinion of the best authorities in the world, we have now got to a point in silver coinage beyond which it was dangerous for us to go. The need of currency was a need created not by law, but by business. Whenever the Treasury could no longer maintain a gold basis, then the public would have to take care of themselves. The silver dollars had thus far remained at par with gold because they had but a limited use, and were limited in number, within the limit of the public needs; but the Gresham law still held good, after three centuries of observation, namely, that bad money drives out good money. All history taught that with a currency of a fluctuating value, as ours was tending to become, speculation was encouraged and monetary ruin hastened. The loss would always fall on the producers of our country, as the importers would protect themselves. The blow aimed by the silver men at the "bloated bondholder," Mr. McPherson insisted, would strike with tenfold force on the head of the laborer.

The annual statements of the New York fire-insurance companies show that they have had a year of unusual prosperity. Nevertheless, according to careful estimates, the fire losses in the United States and Canada during the year 1885 make an aggregate of \$94,200,000, or \$15,000,000 less than in 1884.

The immense quantity of land which has been taken up and purchased by alien capitalists and corporations is receiving the attention of our authorities at Washington. Under the common law of England, and indeed in nearly all the countries of Europe, the right to hold real estate was limited to the subject and prohibited to aliens, and the rule was not relaxed in England until 1870. In most of the States of the Union the disability of aliens to hold real property has been abolished, but Mr. Payson, of the Committee on Public Lands, thinks that in view of the practice, now grown to enormous proportions, of aliens acquiring land in the Territories in vast areas, very often by fraudulent devices in evasion of the public land laws, there is a necessity for prompt action by the United States Government. He has therefore prepared and will soon offer a bill providing that no non-resident alien, nor any resident alien, who has not declared his intention to become a citizen of the United States, nor any corporation or association of whose stock or right of property so much as one-tenth is controlled by aliens, shall acquire, own, hold or possess by purchase or descent any real estate in any of the Territories of the United States, excepting so much real estate as may be necessary to the operation of railroads.

The chief clerk of the New York Building Bureau has completed the compilation of the plans filed for new buildings and alterations of old ones during last year. The total for both makes the cost \$52,268,838, or an increase over the previous year of \$6,548,095. This is the highest figure ever reached in any one year since the organization of the bureau.

One of our morning newspapers exhibits an elaborate array of figures, purporting to have been compiled from the public records, to prove that the horse-car railroads of this city are receiving over \$3,500,000 annual profits, and that within the last 10 years the public treasury should have realized \$34,000,000 from valuable franchises which have been granted virtually without consideration.

The decline in the price of silver reported for three days in succession by cable from London during the past week is having a serious effect upon the prices of cotton. In one instance a decline of 1/4d. per ounce in silver caused cotton in this market to drop 8 to 9 points. An important outlet for the product of Eastern mills is in China and India, and a decline in the price of silver necessarily reduces the shipping margin.

John G. Stevens, a distinguished canal engineer, and of late identified with the Panama Canal plans, died suddenly in Trenton last week.

The \$1,000,000 suit against the Commissioners of Emigration by the Liverpool, New York and Philadelphia Steamship Co. was finally dismissed by Judge Wallace in the United States Circuit Court. The suit was to recover head moneys on immigrants collected from the steamship companies for the immigrants under a law afterward declared to be unconstitutional.

According to the *Pensacola Commercial*, "a gentleman from Amsterdam is now investigating the Southern gulf ports with a view to select one suitable for commerce and shipbuilding and for the establishment of a shipyard and trade center. He is said to represent a large and wealthy syndicate in Holland."

The fate of the Panama Canal is about to be decided by an official report to the French Government. If not favorable the work will be abandoned.

As showing the caution observed in the prospect of a possible silver cataclysm, it is stated by the manager of the Liverpool and

London and Globe Insurance Co. that that company have decided to make no further loans except on the specific agreement of their payment in gold coin.

The Anglo-African Steamship Co. report that they are unable to make a dividend, owing to the depressed condition of trade, and prospects are far from encouraging. African produce is selling at about one-half the prices current a year ago, so that the much vaunted openings for African trade indulged in for some time past prove to have been illusory.

A "wild" torpedo which broke loose from its moorings on the coast of Africa is one of the perils of navigation in the Mediterranean.

The lumber cut of the Saginaw Valley for 1885 was 717,700,000 feet, or 240,000,000 less than that of the previous year, and the stock on hand is much smaller.

The recent death of Stephen B. Guion, head of the firm of Guion & Co., and founder of the steamship line which bears his name, has been speedily followed by that of his nephew, William H. Guion, Jr., who died in this city, the 7th inst., of pneumonia, at the age of 37 years. He was born in New York, and when a lad entered the office of Williams & Guion as an office boy. He advanced steadily, and on the retirement of his uncle, William H. Guion, two years ago, was admitted to a partnership, the firm having become Guion & Co. after the death of Mr. Williams. For the past two years he had been the head of the steamship line in this country, his uncle, Mr. Stephen Guion representing the firm abroad.

An 8-foot vein of fire-clay has been struck at Saltsburg, Pa. The largest worked in this country is at Bolivar, Pa., it being 20 feet thick. The Lemont Furnace Co. are working several veins near Uniontown 6 feet thick and upward.

A new oil region has been discovered in Allegany County, N. Y., and eight wells will soon be down.

The well-known mechanical engineer and inventor, Theodore Bergner, for many years with Wm. B. Sellers & Co., and who took an active interest in the mechanical exhibitions in Paris and Vienna, died in Philadelphia last week, aged 51 years.

The Executive Council of the American Exhibition in London announces officially a postponement of the opening until May, 1887, in order to avoid a conflict with the Colonial and Indian Exhibition of the coming summer. United States Consul-General Waller, in referring to the subject, says that while he believes an American exhibition in London, if opportunely held, will advance the commercial relations of both England and America, he is convinced that the holding of two great industrial exhibitions—the Colonial and Indian and the American—simultaneously in London in 1886 would be unfortunate for either one or the other and very likely for both. The Colonial and Indian exhibition to be held at Ottawa, Ont., promises to be a great success. The collection from the Province of Quebec is notably large and valuable.

Advices from Yokohama state that the Japanese Government has fixed the standard of variation in their silver coinage at one to three per 1000. It was formerly one to two per 1000. The United States variation is one to three and the English one to four.

A cotton warehouse in Louisville collapsed in consequence of overloading the floors, and a stove being overturned the entire property was burned to ashes. More serious still, two well-known citizens, Colonel Wright and J. M. Balmforth, were entangled in the ruins and lost their lives. The pecuniary loss is \$140,000.

Responsible Manchester merchants have given their support to the new railway syndicate for constructing a line on the banks of the Congo. The plan of the promoters is to connect by railway the enormous stretch of navigable river above Leopoldville, on Stanley Pool, with the 800 miles of waterway below Nokki. Should the project succeed it is hoped to develop an extensive trade with the heart of Africa. Goods will be brought down all the tributaries of the river from regions comprising thousands of square miles to the starting point of the new line, thence carried to Nokki by rail, and reshipped from that point to Europe and to the New World.

A new factor in the grain trade is noticed by a correspondent, who says of the wheat supply: "There is no doubt that the building of a great number of elevators and the greater facilities given to the farmers in the Northwest for storing their wheat have induced them to forward their crops earlier and in greater quantities than usual, and in looking at the amount in sight we overlook the proportionate reduction of the invisible supply. With the development of the elevator system all over the country we must expect to see the crops move much earlier every year, and two or three years hence, when we understand better this system, 100,000,000 bushels in sight early after harvest will not scare us as much as 50,000,000 just now."

The Canadian Pacific Co. will, before many months have passed, be in a position to open up an independent system of electric telegraph to the Pacific Coast. The company

are now putting up between Montreal and Winnipeg wires of an exceptionally large capacity.

In the distribution of chairmanships among the various States as announced by Speaker Carlisle on the 7th inst., the South receives 21 chairmanships, the West 15 and the East seven. The chairmanships are assigned to the States as follows:

Georgia	1	Pennsylvania	2
Illinois	2	Virginia	3
Missouri	4	Texas	3
Kentucky	3	New York	4
Alabama	2	Wisconsin	2
Indiana	3	Ohio	3
Florida	1	Georgia	2
Louisiana	1	Connecticut	1
South Carolina	2	Michigan	1
Iowa	1	Tennessee	2
Mississippi	1	North Carolina	3
West Virginia	1	Arkansas	1

The most prominent chairmen are as follows: Appropriations, Randall, of Pennsylvania; Ways and Means, Morrison, of Illinois; Coinage, Bland, of Missouri; Commerce, Reagan, of Texas; Manufactures, Wise, of Virginia; Labor, O'Neil, of Missouri; Patents, Mitchell, of Connecticut; Foreign Affairs, Belmont, of New York.

A dry-goods warehouse to be erected on Sixth avenue, above Twenty-second street, for Ehrich Bros., will cost \$300,000. A. Zucher & Co. are the architects.

Muskets for the interior of Africa are still made in Birmingham with the flint lock and priming pan of a century ago, being best adapted to nomad life.

The Secretary of War will soon report respecting the needs of our coast defenses, giving our largest cities the first attention. He says these are of little use without a navy as an auxiliary.

The negro exodus from the Carolinas, Georgia and Alabama to Arkansas is beginning to be felt in all the States of the South. The attraction is lessened expense in living and better wages in the new "land of promise."

The year's arrivals at Castle Garden, according to the records kept by Captain Moore, the landing agent, comprise 55,160 cabin and 281,170 steerage passengers.

The Colombian Government, through its Attorney-General, seeks in the United States Supreme Court to compel the Panama Railway Co. to indemnify the Panama Canal Co. for alleged losses sustained in consequence of the building of a parallel route between Colon and Panama, in violation of a contract conferring upon the former exclusive privileges. The Attorney-General contends that, the railway company having failed to exact such indemnity from the canal company, all the rights in the railway went to the Colombian Government.

Business depression in the Dominion, according to the *Toronto Globe*, has been greatly intensified by the increase of taxation and by the withdrawal from business of the many millions paid into the Government savings banks and buried in unproductive works. Recovery will be retarded by the same causes.

Three experts have been appointed by Chief Engineer Church, in obedience to the demand of the corporation counsel, to thoroughly inspect the aqueduct tunnel and observe the progress of the work.

A new system of cable railway on trial in Binghamton, N. Y., dispenses with the grip. Two cables are used, one driven in the ordinary manner by a stationary engine, the second and smaller cable taking motion from the first. This second cable is led continuously over a loose drum or pulley fixed under the car. While the drum is free to revolve the cable simply imparts motion to it and the car does not move, but by the application of a brake, stopping the motion of the drum, the car is carried forward with the cable. To stop the car the brake is lifted. The secondary cable comes up through the slot in the cable conduit on the approach of a car, and as it passes drops back again below the level of the street. The value of this invention remains to be demonstrated.

The *Mexican Financier*, published in the City of Mexico, sees in the possible silver crisis threatening the United States a grand opportunity for speculators in that Republic. The editor says: "Mexico is now in a situation to convert the 'silver danger' into a source of profit. Individuals or companies who shall now enter into tobacco, sugar or hemp culture, or undertake any one of the characteristic agricultural industries of this country, will have the same advantages as the English planters in Hindostan. They have at their command cheap labor and cheap money with which to recompense that labor. The very depreciation of silver may be converted into a premium for Mexican planters. Out of the nettle danger Mexico, if she be wise and alert, may pluck the flower safely. Mexico may raise at a very low cost all sorts of tropical products, which, in the United States, England or Germany, will bring gold prices." Depreciated silver for the payment of wages and gold prices for the products of that labor would make the "poor man's paradise" more Utopian than ever.

At Cramps' shipyard, in Philadelphia, they are about to commence building the fifth steamship for the Morgan Steamship Co., which belongs to the C. P. Huntington South Pacific combination. It will be called El Monte and will have a tonnage of about 3500.

She will be 350 feet long over all, with 42½ feet beam, and 32½ feet deep. Her engines are expected to develop a speed of 12 knots per hour. A ferry-boat 200 x 36 feet for the Erie Railroad Co. was begun a few days ago.

Several prominent business men in New York have filed papers for the incorporation of 10 electric lighting companies, who are to operate the American system.

Fifteen hundred coal cars lately used on the gravity railroad near Pittston, Pa., have been burnt to obtain the scrap iron used in their construction.

Special Agents Montgomery and Tingle will act in conjunction with Deputy Collector Berry in making a thorough examination of the customs service at New York City. They are instructed to ascertain the methods of doing business, and to suggest such changes as will result in a reduction of expenses.

The extensive mill buildings in Kensington, Pa., known as Arrott's Mills and Beatty's Mills, were destroyed by fire, involving a loss estimated at \$1,000,000. About a dozen firms lose heavily on machinery and stock.

Mr. Warner, United States consul at Cologne, has made a report to the Department of State on the textile industries of Germany, from which it appears that next to the iron and steel industries the textile branch occupies the foremost rank in the manufacturing interests of that country. The latest statistics show that the share capital of all the important companies engaged in this manufacture amounts to no less than \$36,000,000. Fifty large cotton mills are in good working order, but the industry has within two years past experienced considerable curtailment.

Reports from the heads of departments in the New York Post Office show that during the year 1885 there were delivered 273,002,039 pieces of ordinary mail matter. For the Registered-Letter Department, 1,038,788 pieces were delivered, and 589,447 of domestic and 365,757 of foreign origin recorded and distributed to other offices. In the Distribution Department a total of 577,059,286 pieces were handled, of which there were foreign dispatched 19,837,844. The total number of pieces of mail matter of all kinds handled during the year was 852,055,317, a daily average of 2,506,045. Including ordinary mail matter, a total of 3,409,376 pouches, cases and sacks were handled at the office, a daily average of 10,027. The aggregate business of the Money-Order Department for the year amounted to \$70,534,363.01, which, while showing an increase of 125,191 in the number of transactions, shows a decrease in the amount from the previous year of \$2,178,950.82. The total receipts of the office were \$4,344,345, and the total expenditures, \$1,548,866, giving a net revenue of \$2,795,479. The number of employees is 2005.

The official half-yearly statement of the Dominion revenue and expenditure shows an excess of expenditure over revenue at the close of the half-year ending December 31 amounting to \$2,815,150. The total revenue was \$14,755,704, and the total expenditure \$17,570,854. Compared with the last six months of 1884, the statement just issued shows an increase of \$2,710,344 in expenditure, and a diminution of \$1,300,739 of receipts.

The New York Chamber of Commerce last week adopted the report of a special committee favoring reciprocal trade with neighboring countries. The report says the proposed treaty with Spain was the reverse of reciprocal. In a previous report the chamber called attention to the fact that our exports at present to Cuba and Porto Rico are about \$11,000,000 annually; and if we should double this, and make a profit of 10 per cent. thereon, we would only receive \$2,200,000 for the \$25,000,000 now collected in duties on their products, which, by the terms of the proposed treaty, we are called upon to relinquish. With scarcely an exception, all the other countries contiguous to us present more favorable conditions. The following statistics for the year ending June 30, 1885, show this at a glance:

	Imports.	Exports.	Excess of Imports.
Mexico	\$1,397,724	\$3,340,784	\$1,943,060
San Domingo	1,401,419	986,701	414,718
Porto Rico	6,104,363	1,989,305	4,115,058
Cuba	42,306,093	9,006,160	33,299,933

While we take of Mexican products more than she takes of ours, there is no such enormous disparity as in the case of Cuba and Porto Rico. The report suggests that San Domingo is especially friendly to us, and in the event of a foreign war might prove valuable if our treaty with her should include a coaling station.

The Prussian Government vigorously defends the bill for the construction of a canal between the Baltic and North seas, contending that such a canal is necessary for the defense of the country.

The convict-labor problem will probably engage a large share of attention in the New Jersey Legislature this winter. The contract system was abolished in the State prison last spring, and the prison authorities have adopted what is known as the "piece-price" system, under which so much manufactured stuff is delivered to the contractors for so much money. State Prison Keeper Lavery, in his report just submitted,

declares the new system to be perfect, whereas Chief Supervisor Butler, State Comptroller Anderson and others who are active in the State prison management, say that it is a failure. It is not altogether impossible that the difference of views is purely political.

The Sinking Fund Commissioners authorized the making of a 10-year contract at \$150,000 per annum with the New York Water Co., to supply water in the dry-goods district of this city. The water is to be obtained from wells and stored in large iron tanks.

The business of the five ferries on the East River, controlled by the Union Ferry Co., is gradually shrinking under bridge competition. The receipts for the last four years have been as follows: 1882, \$144,008; 1883, \$138,856; 1884, \$120,875, and 1885, \$104,441.

The unarmored vessels for the United States Navy, to be built by the Government, will mark a new departure in marine engineering. Though small, they must have engines of 8500 horse-power, capable of developing 18 miles an hour, which presents a difficult problem. Chief Engineer Loring is confident that these vessels will surpass anything that England possesses.

The work of dredging Hell Gate has been put in charge of Colonel McFarland, with Lieutenant Derby as assistant, General Newton no longer taking personal charge. Since October to 6700 tons of rock have been removed, which is much more rapid progress than was made at Hallett's Point. The channel over Nigger Heads will be completed in the spring.

One of the parties in the Connecticut Legislature zealously champions a repeal of the law under which wages of workmen may be attached for debt.

The first telegraph line in Korea was opened September 27, and the electric light is about to be introduced into the royal palace. The King manifests great confidence in the United States.

Adolph Sutro, of tunnel fame, proposes to build a large aquarium near the Cliff House, which will be stocked with every variety of sea anemone and shell-fish. It is to be 120 feet in diameter, and promises to become a rival attraction to the sea lions.

Andrew Carnegie, the Pittsburgh millionaire, having expressed a willingness to contribute \$250,000 to the city for a library, the papers suggest that he use it for the founding of a "Carnegie Technical School."

The Hebrew Technical Institute, in Crosby street, this city, has at present 65 pupils, who weekly visit various industrial establishments and give a written description of what they have seen. Training for special trades will be introduced next spring.

The investments made in the manufacture of silk in Pennsylvania within the last 12 months amount to nearly \$2,000,000. Factories have been started at Easton, Bethlehem, Mauch Chunk, Allentown and in Monroe County. In each town the residents have become interested in the stock.

The production of bricks in 1885 at all points tributary to the New York market was 850,000,000, against about 650,000,000 in 1884. The stock on hand is estimated at 200,000,000.

The Edmunds bill against the Mormons passed the United States Senate 8th inst. The main feature of the bill is that the Territorial laws creating and continuing the Mormon Church corporation are annulled, and the President is to appoint, by and with the advice of the Senate, 14 trustees to manage the property and business of the corporation; and the Attorney-General is ordered to institute proceedings to forfeit and escheat all property acquired by the corporation in contravention of the United States laws, the escheated property to be then sold and the proceeds devoted to common-school purposes in the Territory, but no building is to be forfeited that is used exclusively for worship.

As to the actual work done thus far upon the Panama Canal the reports are very slow and discouraging. A canal some 8 or 9 miles in length and of varying depth has been excavated at the Aspinwall end of the line by the American Dredging Co., and some little cutting has been done at the summit. But as the cut at that point will have to be 400 feet deep, should the present plan be carried to completion, there is but little to show for the enormous expenditures made. Such at least are the latest accounts received.

Minneapolis now ranks among the leading grain markets of the United States, the receipts of wheat last year having amounted to 33,500,000 bushels, while the shipment of flour reached nearly 5,000,000 barrels. The 11 mills now running represent about 15,500 barrels daily capacity.

As the fisheries question will soon come up in Congress, that our relations with the Dominion touching this interest may be equitably adjusted, it is appropriate to mention that, according to the last census, there were no less than 37,043 men living on the New England coast alone, with an invested capital of \$20,000,000, engaged mostly in the fisheries concerned.

Current Hardware Prices, January 13, 1886.

HARDWARE.

Ammunition.

Black & Goldmark's	50¢
E. B. Trimmer, 1-10's	50¢
E. B. Trimmer, 1-10's	50¢
E. B. Trimmer, 1-10's	50¢
E. B. Trimmer, 1-10's	50¢
E. B. Trimmer, 1-10's	50¢
E. B. Trimmer, 1-10's	50¢
E. B. Trimmer, 1-10's	50¢
E. B. Trimmer, 1-10's	50¢
E. B. Trimmer, 1-10's	50¢

Cartridges.

Cartridges	See Ammunition.
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Cast Iron.

Cast Iron	See Cast Iron.
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Cast Steel.

Cast Steel	See Cast Steel.
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Cast Brass.

Cast Brass	See Cast Brass.
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Cast Copper.

Cast Copper	See Cast Copper.
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Cast Lead.

Cast Lead	See Cast Lead.
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Cast Zinc.

Cast Zinc	See Cast Zinc.
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Cast Tin.

Cast Tin	See Cast Tin.
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Cast Nickel.

Cast Nickel	See Cast Nickel.
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Cast Silver.

Cast Silver	See Cast Silver.
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Cast Gold.

Cast Gold	See Cast Gold.
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Cast Platinum.

Cast Platinum	See Cast Platinum.
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Cast Palladium.

Cast Palladium	See Cast Palladium.
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Cast Rhodium.

Cast Rhodium	See Cast Rhodium.
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Cast Iridium.

Cast Iridium	See Cast Iridium.
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Cast Osmium.

Cast Osmium	See Cast Osmium.
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Cast Selenium.

Cast Selenium	See Cast Selenium.
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Cast Tellurium.

Cast Tellurium	See Cast Tellurium.
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Cast Vanadium.

Cast Vanadium	See Cast Vanadium.
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Cast Chromium.

Cast Chromium	See Cast Chromium.
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Cast Manganese.

Cast Manganese	See Cast Manganese.
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Cast Silicon.

Cast Silicon	See Cast Silicon.
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Cast Boron.

Cast Boron	See Cast Boron.
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Cast Fluorine.

Cast Fluorine	See Cast Fluorine.
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Cast Chlorine.

Cast Chlorine	See Cast Chlorine.
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Cast Bromine.

Cast Bromine	See Cast Bromine.
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Cast Iodine.

Cast Iodine	See Cast Iodine.
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Cast Hydrogen.

Cast Hydrogen	See Cast Hydrogen.
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Cast Oxygen.

Cast Oxygen	See Cast Oxygen.
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Cast Nitrogen.

Cast Nitrogen	See Cast Nitrogen.
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Cast Carbon.

Cast Carbon	See Cast Carbon.
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Cast Sulfur.

Cast Sulfur	See Cast Sulfur.
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Cast Phosphorus.

Cast Phosphorus	See Cast Phosphorus.
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Cast Potassium.

Cast Potassium	See Cast Potassium.
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Cast Sodium.

Cast Sodium	See Cast Sodium.
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Cast Calcium.

Cast Calcium	See Cast Calcium.
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Cast Magnesium.

Cast Magnesium	See Cast Magnesium.
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Cast Barium.

Cast Barium	See Cast Barium.
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Cast Strontium.

Cast Strontium	See Cast Strontium.
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Cast Radium.

Cast Radium	See Cast Radium.
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Cast Actinium.

Cast Actinium	See Cast Actinium.
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Cast Thorium.

Cast Thorium	See Cast Thorium.
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Cast Protactinium.

Cast Protactinium	See Cast Protactinium.
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Cast Uranium.

Cast Uranium	See Cast Uranium.
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Cast Neptunium.

Cast Neptunium	See Cast Neptunium.
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Cast Plutonium.

Cast Plutonium	See Cast Plutonium.
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Cast Americium.

Cast Americium	See Cast Americium.
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Cartridges.

Cartridges	See Ammunition.
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Cast Iron.

Cast Iron	See Cast Iron.
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Cast Steel.

Cast Steel	See Cast Steel.
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Cast Brass.

Cast Brass	See Cast Brass.
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Cast Copper.

Cast Copper	See Cast Copper.
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Cast Lead.

Cast Lead	See Cast Lead.
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Cast Zinc.

Cast Zinc	See Cast Zinc.
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Cast Tin.

Cast Tin	See Cast Tin.
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Cast Nickel.

Cast Nickel	See Cast Nickel.
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Cast Silver.

Cast Silver	See Cast Silver.
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Cast Gold.

Cast Gold	See Cast Gold.
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Cast Platinum.

Cast Platinum	See Cast Platinum.
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Cast Palladium.

Cast Palladium	See Cast Palladium.
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Cast Rhodium.

Cast Rhodium	See Cast Rhodium.
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Cast Iridium.

Cast Iridium	See Cast Iridium.
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Cast Osmium.

Cast Osmium	See Cast Osmium.
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Cast Selenium.

Cast Selenium	See Cast Selenium.
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Cast Tellurium.

Cast Tellurium	See Cast Tellurium.
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Cast Vanadium.

Cast Vanadium	See Cast Vanadium.
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Cast Chromium.

Cast Chromium	See Cast Chromium.
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Cast Manganese.

Cast Manganese	See Cast Manganese.
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Cast Silicon.

Cast Silicon	See Cast Silicon.
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Cast Boron.

Cast Boron	See Cast Boron.
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Cast Fluorine.

Cast Fluorine	See Cast Fluorine.
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Cast Chlorine.

Cast Chlorine	See Cast Chlorine.
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Cast Bromine.

Cast Bromine	See Cast Bromine.
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Cast Iodine.

Cast Iodine	See Cast Iodine.
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Cast Hydrogen.

Cast Hydrogen	See Cast Hydrogen.
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Cast Oxygen.

Cast Oxygen	See Cast Oxygen.
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Cast Nitrogen.

Cast Nitrogen	See Cast Nitrogen.
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Cast Carbon.

Cast Carbon	See Cast Carbon.
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Cast Sulfur.

Cast Sulfur	See Cast Sulfur.
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Cast Phosphorus.

Cast Phosphorus	See Cast Phosphorus.
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Cast Potassium.

Cast Potassium	See Cast Potassium.
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Cast Sodium.

Cast Sodium	See Cast Sodium.
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Cast Calcium.

Cast Calcium	See Cast Calcium.
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Cast Magnesium.

Cast Magnesium	See Cast Magnesium.
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Cast Barium.

Cast Barium	See Cast Barium.
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Cast Strontium.

Cast Strontium	See Cast Strontium.
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Cast Radium.

Cast Radium	See Cast Radium.
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Cast Actinium.

Cast Actinium	See Cast Actinium.
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Cast Thorium.

Cast Thorium	See Cast Thorium.
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Cast Protactinium.

Cast Protactinium	See Cast Protactinium.
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Cast Uranium.

Cast Uranium	See Cast Uranium.
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Cast Neptunium.

Cast Neptunium	See Cast Neptunium.
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Cast Plutonium.

Cast Plutonium	See Cast Plutonium.
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Cast Americium.

Cast Americium	See Cast Americium.
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Cast Curium.

Cast Curium	See Cast Curium.
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Cast Berkelium.

Cast Berkelium	See Cast Berkelium.
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Cast Californium.

Cast Californium	See Cast Californium.
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Cast Einsteinium.

Cast Einsteinium	See Cast Einsteinium.
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Cast Fermium.

Cast Fermium	See Cast Fermium.
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Fences.

Fences	See Fences.
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Cast Iron.

Cast Iron	See Cast Iron.
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Cast Steel.

Cast Steel	See Cast Steel.
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Cast Brass.

Cast Brass	See Cast Brass.
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Cast Copper.

Cast Copper	See Cast Copper.
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Cast Lead.

Cast Lead	See Cast Lead.
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Cast Zinc.

Cast Zinc	See Cast Zinc.
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Cast Tin.

Cast Tin	See Cast Tin.
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Cast Nickel.

Cast Nickel	See Cast Nickel.
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Cast Silver.

Cast Silver	See Cast Silver.
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Cast Gold.

Cast Gold	See Cast Gold.
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Cast Platinum.

Cast Platinum	See Cast Platinum.
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Cast Palladium.

Cast Palladium	See Cast Palladium.
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Cast Rhodium.

Cast Rhodium	See Cast Rhodium.
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WHOLESALE METAL PRICES, January 13, 1886.

METALS.

IRON.—Duty: Bars, 8-10¢ to 11-10¢ per lb.; provided that no bar iron shall pay a less rate of duty than 35¢. Sheet, 11-10¢ to 15-10¢ per lb. Band, Hoop and Scrolled, 14¢ to 17-10¢ per lb. Railroad Bars weighing more than 25 lb per yard, 7-10¢ of 1¢ per lb.

Standard American Pig Iron.
 Foundry No. 1 X..... per ton \$18.00 @ 18.50
 Foundry No. 2 X..... per ton 17.00 @ 17.50
 Gray Forge..... per ton 16.00 @ 16.50

No. 1 Scotch Pig Iron.
 Cambro..... per ton 20.00 @ 20.50
 Coltness..... per ton 20.00 @ 20.50
 Shotts..... per ton 20.00 @ 20.50
 Gartcharrie..... per ton 20.00 @ 20.50
 Langloan..... per ton 20.00 @ 20.50
 Sumner..... per ton 20.00 @ 20.50
 Dalmeilington..... per ton 20.00 @ 20.50
 Clyde..... per ton 20.00 @ 20.50

Steel, at Eastern mills...... per ton \$24.00 @ 24.50
Old Rails, Ts...... per ton \$21.00 @ 22.00

Wrought, per ton from yard...... 19.50 @ 20.00

Common Iron.
 1/4 to 1 in. round and square..... per lb. 1.05 @ 1.75
 1 to 6 in. x 1/4 to 1 in. per lb. 1.85 @ 2.35

Refined Iron.
 1/4 to 2 in. round and square..... per lb. 1.85 @ 2.35
 1 to 6 in. x 1/4 to 1 in. per lb. 1.9 @ 2.45
 Rods—1/4 and 1-1/2 round and sq..... per lb. 1.7 @ 2.25
 Bands—1 to 6-1/2 round and sq..... per lb. 1.7 @ 2.25
 Burden's Best "H. B. & S." Iron, base price..... 2.50
 Burden's "H. B. & S." Iron, base price..... 2.50
 Norway Nail Rods..... 5 @ 6¢

Sheet Iron from Store.
 Common..... per lb. 3.70 @ 3.85
 R. G. Cleaned..... per lb. 3.70 @ 3.85
 Nos. 10 to 16..... per lb. 3.70 @ 3.85
 17 to 20..... per lb. 3.70 @ 3.85
 21 to 24..... per lb. 3.70 @ 3.85
 25 and 26..... per lb. 3.70 @ 3.85
 27..... per lb. 3.70 @ 3.85

Galvanized, 10 to 20...... per lb. 5 @ 5.50
 Galvanized, 21 to 24..... per lb. 5 @ 5.50
 Galvanized, 25 to 28..... per lb. 5 @ 5.50
 Galvanized, 29..... per lb. 5 @ 5.50
 American Russia..... per lb. 5 @ 5.50
 Russia..... per lb. 5 @ 5.50
 American Cold Rolled H. B. & S. Iron..... 5 @ 6¢

Iron Wire.—(See Wire.)
STEEL.—Duty: Ingots, Bars, Sheets, &c., valued at 4¢ per lb. less 4¢ ad val.; valued above 4¢ and not above 7¢ per lb., 3¢ per lb.; valued above 7¢ and not above 10¢ per lb., 2¢ per lb.; valued above 10¢ per lb., 1¢ per lb. Extra—Steel Bars, Rods, &c., cold hammered or polished, in any way in addition to ordinary hot rolling, 1¢ per lb. in addition to above; Steel Circular Saw Plates, 1¢ per lb. in addition to the above.

American Cast Steel.
 For American Steel, see Pittsburgh quotations.

Chrome Steel.
 Tool Steel, ordinary sizes, 1/2 to 3 inches..... 10 @ 14¢
 Adamantine Shoes and Dies..... 8 @ 14¢
 Magnet Steel..... 14 @ 14¢

English Steel.
 Best Cast..... per lb. 15 @ 16¢
 Extra Cast..... per lb. 16 @ 17¢
 Circular Saw Plates..... per lb. 14 @ 15¢
 Round Machinery Cast..... per lb. 10 @ 11¢
 Swaged Cast..... per lb. 10 @ 11¢
 Best Double Shear..... per lb. 15 @ 16¢
 Bilister, 1st quality..... per lb. 10 @ 11¢
 German Steel, Best..... per lb. 10 @ 11¢
 2d quality..... per lb. 9 @ 10¢
 3d quality..... per lb. 8 @ 9¢
 Sheet Cast Steel, 1st quality..... per lb. 15 @ 16¢
 2d quality..... per lb. 14 @ 15¢
 3d quality..... per lb. 13 @ 14¢

TIN.—Duty: Plates, Sheets, Tagger and Terno, 1¢ per lb.; Bars, Block and Pig free.

Charcoal Tin Plates.
 1 C 10x14 225 sheets..... box \$5.25 @ 7.25
 1 C 12x12 225 sheets..... 5.25 @ 7.50
 1 C 10x28 112..... 10.50 @ 14.50
 1 X 10x14 225 sheets..... 6.25 @ 9.25
 1 X 12x12 225 sheets..... 6.25 @ 9.25
 1 X 10x28 112..... 6.25 @ 9.25
 D C 10x14 225 100..... 5.00 @ 5.50
 D X 12x12 100..... 6.25 @ 7.00
 For each additional X add..... 1.25 @ 2.00

Coke Tin Plates.
 Best..... Ordinary
 1 C 10x14..... \$4.25 \$4.65 @ 4.75
 1 C 12x12..... 4.75 @ 4.75
 1 C 10x28, gutters, 225 sheets..... 5.00 7.25
 1 C 10x28, 112 sheets..... 10.25

Terne Plates.
 Prime Char. 2d quality..... Coke.
 1 C 14x20 M. P. 50.875 @ 7.125..... \$6.875 @ 14.00
 1 C 14x20..... 14.00
 1 C 14x30..... \$4.75 @ 4.75
 1 X 14x30..... 6.25 @ 6.75
 1 X 20x28..... 9.25 @ 9.75
 1 X 20x38..... 12.75 @ 14.50
 1 C 20x30..... 13.50 @ 14.50

Tin Boiler Plates.
 1 X 14x28, 2 sheets for No. 7, 112 sheets..... @ \$12.00
 1 X 14x28, 2 " " No. 8..... @ 13.00
 1 X 14x28, 2 " " No. 9..... @ 15.00

COPPER.—Duty: Pig, Bar and Ingot, 4¢; Old articles of which Copper is a component of chief value, 35¢ ad valorem.

Ingots. Lake..... per lb. 11 1/2¢ @ 12¢
 Ingots, Baltimore..... per lb. 11 1/2¢ @ 11 1/2¢
 Ingots, Anchor..... per lb. 11 1/2¢ @ 11 1/2¢

Braziers' Copper, ordinary sizes.
 10 oz. sq. ft. and over..... @ 17¢
 Braziers' Copper, ordinary sizes, under 10 oz. and over 12 oz. sq. ft..... @ 19¢
 Braziers' Copper, 10 oz. and 12 oz. sq. ft..... @ 21¢
 Lighter than 10 oz. sq. ft..... @ 23¢
 Circles less than 24 in. in diam..... @ 24¢
 24 in. diam. and over..... @ 25¢
 Segment and Pattern Sheets..... @ 21¢
 Locomotive Fire-Box Sheets..... @ 20¢
 Sheathing Copper, over 12 oz. sq. ft..... 15 1/2¢ @ 16¢
 Bolt Copper..... @ 17¢
 Copper Bottoms..... @ 19¢
 Nickel-Plated Sheathing..... @ 38¢
 Plating extra..... for boilers @ 38¢
 Flat Copper Boiler Bottoms or Pit Bottoms, cut to special sizes..... @ 22¢

Tinning.
 14x18, by the case..... per sheet, 5¢
 14x18, less than case..... 4¢
 For tinning both sides, double the above amount.

O'Neill's Patent Planished Copper, Net.
 14x18..... 14¢
 14 and 16 oz. and heavier..... By the case @ 25¢
 12 oz. and lighter..... 35¢

Boiler Sizes.
 7 in., 14x28, 8 in., 14x36, 9 in., 14x60,
 14 and 16 oz. and heavier..... By the case @ 31¢
 (And all sizes not over 20 in. wide.)
 24x48 and 30x60..... @ 34¢
 12 oz. and lighter..... 37¢

Copper Wire.—(See Wire.)
 Yellow Sheathing Metal..... per lb. 1.80 @ 1.90
BRASS AND GERMAN SILVER.
 Brown Sharps' Gauge the Standard for Metal;
 Old English Gauge the Standard for Wire.
 Brass Manufacturers' Price List, January 17, 1884

LEAD.—Duty: Pig, 2¢ per 100 lb.; Old Lead, 3¢ per 100 lb.; Pipe and Sheet, 3¢ per 100 lb.

Block Tin Pipe...... 40¢
Tin Lined Pipe...... 15¢, dis 20¢
Sheet...... 7 1/2¢, dis 20¢
Shot...... Drop, \$1.35; Buck, \$1.60
Chilled Shot...... \$1.60
ANTI-MONY.
 Hallett's..... per lb. 9 @ 9 1/2¢
 Cookson..... per lb. 9 1/2¢ @ 9 1/2¢
SPELTER.—Duty: Pigs, Bars and Plates, \$1.50 per 100 lbs.

American, cash...... 4 1/2¢ @ 5¢
Bergport...... 4 1/2¢ @ 5¢
ZINC.—Duty: Pig or Block, \$1.50 per 100 lbs.
 Sheet, 3 1/2¢ per lb.
 600 lb casks..... 5.30 @ 5.40¢
 Zinc—Open..... dis. 10 @ 20¢
 Zinc Tubing..... dis. 10 @ 20¢

Plain...... 27¢
Fancy...... 28¢
Scotch and Extra Patterns...... 30¢

BABBIT METAL.
 N. P. U..... per lb. 10 1/2¢ @ 7¢
 X X..... 10¢
 J. H. B..... 15¢

WIRE.
Market Wire.—Put up in 63 lb bundles.
 Nos. 00 to 9, 10, 11, 12, 13, 14, 15, 16, 17, 18,
 10 11 11 1/2 12 1/2 13 1/2 14 1/2 15 1/2 16 1/2 17 1/2 18 1/2

Bright Market Wire...... dis 70¢
 " Bale Wire, Nos. 10 to 12..... dis 65¢
 " Fence Wire, Nos. 8 and 9..... dis 70¢
 " Grape Wire, Nos. 10 to 14..... dis 65¢
 " Coppered Market Wire..... dis 65¢
 " Bale Wire, Nos. 7 to 12..... dis 60¢
 " Galvanized Market Wire..... dis 60¢
 " Fence Wire..... dis 60¢

Stone or Weaving Wire.
 Nos. 16 17 18 19 20 21 22 23 24 25 26
 Cents..... 14 15 16 17 18 19 20 21 22 23 24 25 26
 Nos. 27 28 29 30 31 32 33 34 35 36
 Cents..... 27 28 29 30 31 32 33 34 35 36
 Nos. 37 38 39 40 41 42 43 44 45 46
 Cents..... 37 38 39 40 41 42 43 44 45 46
 Nos. 47 48 49 50 51 52 53 54 55 56
 Cents..... 47 48 49 50 51 52 53 54 55 56
 Nos. 57 58 59 60 61 62 63 64 65 66
 Cents..... 57 58 59 60 61 62 63 64 65 66
 Nos. 67 68 69 70 71 72 73 74 75 76
 Cents..... 67 68 69 70 71 72 73 74 75 76
 Nos. 77 78 79 80 81 82 83 84 85 86
 Cents..... 77 78 79 80 81 82 83 84 85 86
 Nos. 87 88 89 90 91 92 93 94 95 96
 Cents..... 87 88 89 90 91 92 93 94 95 96
 Nos. 97 98 99 100 101 102 103 104 105 106
 Cents..... 97 98 99 100 101 102 103 104 105 106
 Nos. 107 108 109 110 111 112 113 114 115 116
 Cents..... 107 108 109 110 111 112 113 114 115 116
 Nos. 117 118 119 120 121 122 123 124 125 126
 Cents..... 117 118 119 120 121 122 123 124 125 126
 Nos. 127 128 129 130 131 132 133 134 135 136
 Cents..... 127 128 129 130 131 132 133 134 135 136
 Nos. 137 138 139 140 141 142 143 144 145 146
 Cents..... 137 138 139 140 141 142 143 144 145 146
 Nos. 147 148 149 150 151 152 153 154 155 156
 Cents..... 147 148 149 150 151 152 153 154 155 156
 Nos. 157 158 159 160 161 162 163 164 165 166
 Cents..... 157 158 159 160 161 162 163 164 165 166
 Nos. 167 168 169 170 171 172 173 174 175 176
 Cents..... 167 168 169 170 171 172 173 174 175 176
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 Cents..... 177 178 179 180 181 182 183 184 185 186
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 Cents..... 417 418 419 420 421 422 423 424 425 426
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 Cents..... 577 578 579 580 581 582 583 584 585 586
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 Cents..... 587 588 589 590 591 592 593 594 595 596
 Nos. 597 598 599 600 601 602 603 604 605 606
 Cents..... 597 598 599 600 601 602 603 604 605 606
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 Cents..... 607 608 609 610 611 612 613 614 615 616
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 Cents..... 617 618 619 620 621 622 623 624 625 626
 Nos. 627 628 629 630 631 632 633 634 635 636
 Cents..... 627 628 629 630 631 632 633 634 635 636
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 Cents..... 637 638 639 640 641 642 643 644 645 646
 Nos. 647 648 649 650 651 652 653 654 655 656
 Cents..... 647 648 649 650 651 652 653 654 655 656
 Nos. 657 658 659 660 661 662 663 664 665 666
 Cents..... 657 658 659 660 661 662 663 664 665 666
 Nos. 667 668 669 670 671 672 673 674 675 676
 Cents..... 667 668 669 670 671 672 673 674 675 676
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 Cents..... 767 768 769 770 771 772 773 774 775 776
 Nos. 777 778 779 780 781 782 783 784 785 786
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INDUSTRIAL ITEMS.

NEW HAMPSHIRE.

The Nashua Iron and Steel Co. have just completed a shaft for the steamer City of Cambridge, of the Boston and Bangor Line, which weighed 10 tons as it came from the hammer. Some idea of the facilities possessed by the firm may be known when it is stated the shaft was made in seven days of 10 hours each.

MASSACHUSETTS.

The business of the Washburn & Moen Mfg. Co., Worcester, has been about double the last three months the amount it was for the same time last year. Their employees number nearly 3000, and in some departments they are obliged to run overtime.

The employees of the Mason Machine Works, Taunton, each received a card in their pay envelopes on the 16th ult., asking how many were in favor of weekly payments. It is learned that seven eighths of the hands are in favor of such a course, and it is understood the weekly-payment system will be inaugurated on the 16th of January.

The Cunningham Iron Works Co., of Boston, have contracted to build for the towns of Rockland and Abington a steel stand-pipe 25 feet in diameter and 12 feet 5 inches high, with ornamental balcony and cornice, requiring over 200 tons of steel plate material, of strength equal to 60,000 pounds tensile strain per square inch. This tower will contain 2000 tons of water.

RHODE ISLAND.

The Providence Steam Engine Co. are building engines for the following parties: Raymond & Comstock, South Norwalk, Conn., 50 horse-power; J. C. Graham, Philadelphia, 125 horse-power; and building and ready for shipment, Smith Granite Co., Westbrook, 50 horse-power; Peter Scheinin, Philadelphia, 175 horse-power; Hoyle, Harrison & Kaye, 125 horse-power; Owen Osborne, 50 horse-power; Arlington Mills, Lawrence, Mass., 300 horse-power; New England Co., Rockville, Conn., 125 horse-power.

Commencing last Monday the employees of the American Screw Co., North Providence, will be paid weekly. Both mills of the company are running 10 hours per day.

The Shelton Silver Plate Cutlery Co.'s hands have demanded an advance of 10 per cent. in wages, and it is said that it is a signal for a big strike among all the cutlery workers in New England, who have a compact organization, the strongest in the labor movement.

CONNECTICUT.

Owing to financial troubles Brown Bros.' extensive brass mill, in Waterbury, shut down last week, throwing 500 hands out of employment. Franklin Farrell, of Ansonia, a millionaire brass manufacturer, has been taken into the management, and it is expected that he will arrange for the resumption of business.

The Farrell Foundry Co., Waterbury, are making machinery for the manufacture, by the Pittsfield, Mass., Button Co., of a very ingenious shoe button invented by George H. Bliss, of the latter company.

The business outlook at Southington is much better than a year ago. The Etna Nut Co. have orders ahead in their rolling mill and will not shut down for more than three or four days. Last year the mill was closed five or six weeks. The Peck, Stow & Wilcox Co. will take inventory while the factory is in operation, and will allow their machinery to stand idle only a few days.

NEW YORK.

The Buffalo Bridge Works have secured the contract for building the Union Pacific Railroad bridge at Omaha.

NEW JERSEY.

The proprietors of the Boonton Iron Works, of Boonton, which have been idle for 12 years, have announced their intention of starting the works again.

The Cumberland Nail and Iron Co., who recently added 5 per cent. to the wages of their 400 employees, announce a reduction of a like amount, to take effect on the 2d day of January. The company say that they are forced to this step by the state of the market.

Hundreds of new men have been taken on at the Rogers Locomotive Works, of Paterson, and the establishment is put on full time for the first time in a long while. Thirty-six engines are laid out for the coming three months, just double the number for the preceding quarter.

Some years ago the Delaware Rolling Mill was sold under the hammer at great sacrifice. Since then it has been closed. It is said that the mill is to be overhauled, new machinery put in and the works started up by March. The mill cost \$250,000 and employed 200 men.

PENNSYLVANIA.

The Bethlehem Iron Co., at Bethlehem, are shipping 40 cars of steel rails daily over the Lehigh Valley Railroad to Perth Amboy, N. J.

Orr, Painter & Co., of Reading, have made application for a charter for a stove company; capital stock, \$400,000.

Mr. W. D. Hofius, proprietor of the Sharpsville Foundry and Machine Works, went to New York City during the holidays, and while there purchased from the administrator of an estate the rolling mill at Marietta, Ohio. The plant is a large one, and originally cost \$240,000, but has been idle for 10 years.

The new furnace of Messrs. A. & A. H. Brock, at North Lebanon, was put in blast last week. The furnace has all the latest improvements and is calculated to produce from 900 to 1000 tons of iron per week.

All the metal produced by Hecla Furnace of McCoy & Linn, at Milesburg, is consumed by their own forge in the production of a high grade of forge iron.

The Pottstown Iron Co. are preparing to blow out the Anvil Furnace, at Pottstown, which was put in blast over two weeks ago.

The furnace has not worked properly on account of the lining. It will probably be a month or more until the furnace can again be put in operation.

Mabel Furnace, in the Shenango Valley, will blow in soon.

Cofrode & Saylor, Pottstown, have received the contract for the 250 foot arsenal drawbridge for the Pennsylvania Railroad Co. at Philadelphia.

Joanna Furnace (charcoal), which has been idle for two years, will blow in in about six weeks.

One Montour Furnace will blow in the present week.

Maiden Creek Furnace (charcoal) will blow in this month.

PITTSBURGH AND VICINITY.

A new tack factory is to be erected on the Southside, on the hill at the head of South Twenty-second street. The firm will be Hollis, Goldbach & Co., who have been given an acre of ground by Flach & Co., who own a tract of 14 acres at that place. Mr. Joseph Goldbach also owns some land in the vicinity, and has given to the firm 1 acre of coal and $\frac{1}{2}$ acre of land. About 150 machines, with the latest improvements, will be put in, and employment will be given to 400 hands. A substantial building will be put up immediately, and it is expected that the manufacture of tacks will be begun by at least the 1st of July.

The Youghiogeny River Coal Co. have purchased two large coal mines on the Pittsburgh, McKeesport and Youghiogeny Railroad, one above and the other below Douglass Station. This makes six of the most extensive coal works along the Youghiogeny River now controlled by this company.

The firm of Wilson, Walker & Co., iron manufacturers, of Pittsburgh, has ceased to exist, having been merged in the new company of Carnegie, Phipps & Co. The Lucy Furnace Co. and Pittsburgh Bessemer Steel Co., which have hitherto remained separate organizations under the control of the firm of Carnegie Bros. & Co., are also merged in the new firm. The firm of Carnegie, Phipps & Co. have a capital of \$3,000,000 and will operate the Lucy Furnaces, the Twenty-ninth Street Iron Works and the Homestead Steel Works. The stock, of which \$2,200,000 is in property and \$800,000 in cash, is divided as follows: Andrew Carnegie, \$1,575,000; Thomas M. Carnegie, \$480,000; Henry Phipps, Jr., \$480,000; David A. Stewart, \$105,000; John Walker, \$90,000; W. H. Singer, \$45,000; George Lauder, \$30,000; H. M. Curry, \$30,000; Samuel E. Moore, \$30,000; Wm. L. Abbott, \$30,000; H. W. Borntraeger, \$30,000; John W. Vandevort, \$30,000; E. A. Macrum, \$15,000; H. P. Smith, \$10,000; James H. Simpson, \$10,000; W. W. Blackburn, \$5,000; C. F. Forster, \$5,000. The officers are: John Walker, chairman; H. P. Smith, secretary; W. H. Singer, treasurer; Julian Kennedy, general superintendent; Walter Kennedy, manager Lucy Furnaces; Charles L. Taylor, superintendent Homestead Steel Works.

The new Bessemer plant being erected by Shoenberger & Co., of Pittsburgh, will be completed in a few days. Of the size it will be one of the finest of its kind in the country. The firm, it is understood, will commence the manufacture of steel nails exclusively with the completion of the new plant.

The National Tube Works Co., at McKeesport, have decided to erect three new mills for the manufacture of 18, 20 and 24 inch pipe, which has never been made by the above firm. The buildings will be constructed as soon as the weather will permit.

Soho Furnace has been relined and altered in some respects, and will be blown in about the 15th inst. Bessemer iron will be made at first.

The Rochester Tumbler Co. have just finished an order for 25,000 fish-plates to be placed under the rails of the Ninth Avenue Elevated Railroad Co., of New York. They will be made entirely of glass.

The Keystone Bridge Co., of Pittsburgh, have just contracted to make 13 spans of bridgework on the East Tennessee, Virginia and Georgia Railroad. Each of the spans is to form a bridge in itself. The shortest is to be not less than 150 feet long, and some will go over 200 feet. Over 1,500,000 pounds of steel and iron will be used in their construction. All the bridges are single track, and work will be begun on them the 1st of February.

J. P. Witherow, of Pittsburgh, has begun work on the erection of the new blast-furnace plant to be erected for the Troy Steel and Iron Co., at Troy, N. Y. The work is a very extensive one and will occupy about 18 months.

Jones & Laughlins contemplate either remodeling the old Eliza Furnace for the making of Bessemer pig iron to supply their new steel converter on the Southside, or tearing down the present furnace and building a new one.

The Pittsburgh Tube Co. were chartered on the 6th inst. The capital stock is \$150,000. The directors are Geo. F. McCane, Maxwell R. Moorhead, Wm. I. Moorhead and James McCutcheon, of Pittsburgh, and James H. Lindsay and James McCutcheon, of Allegheny.

The New York and Westmoreland Gas, Coal and Coke Co. have secured one of the largest coal contracts awarded this season. It is for supplying the New York Gas Co., the works of which consume over 200,000 tons of coal yearly. The mines of this company are situated at Manor Station, on the Pennsylvania Railroad, near Greensburg.

The river miners in Pittsburgh and vicinity have resumed work at 2½ cents, the operators' prices. It is estimated that the miners have lost \$450,000 in wages.

OHIO.

The nail works of the Belfont Iron Works Co., at Ironton, have suspended operations.

The management of the Cleveland Rolling Mill Co. have raised the wages of all their employees 10 per cent., dating from January 1. Under the advance the lowest wages

paid will be \$1.10, the highest \$16, and the average about \$3.50 per day. About 3000 men are interested, and are the same who engaged in the strike last summer.

Recently the Ohio Iron and Steel Co., operating the Mary Furnace, at Lowellville, leased the Struthers Furnace, belonging to the plant of Brown, Bonnell & Co., and organized what is known as the Struthers Furnace Co. The stockholders met at Youngstown last Saturday and organized by electing Col. James Pickands, of Cleveland, president; Myron C. Wick, Youngstown, vice-president; Robert Bentley, Youngstown, treasurer and general manager. The furnace was blown in on the 4th inst.

Hecla Furnace, in the Hanging Rock region, will bank up on the 1st of February, and will remain out of blast for three months.

Mollie Furnace, the property of the New York and Perry Coal and Iron Co., at Shawnee, blew in on the 17th of December.

Jefferson Furnace, in the Hanging Rock region, blew out last week.

Star Furnace, in the Hanging Rock region, now out of blast, will blow in about the 20th inst.

It is said that the Bellaire Nail Co., at Bellaire, will erect a mill for the manufacture of bar iron.

The Cleveland Hardware Co. are about moving into their new works on Lake street. They will be in operation in a few days. Their new works will consist of a brick building 60 x 250, and a frame 50 x 175.

The Webster, Camp & Lane Machine Co., Akron, are building a Brown blast-furnace hoist for the Woodward Iron Co., Ala., and recently shipped a hoist for the coal mine of the Walker Coal and Iron Co., Rising Fawn, Ga. They are also furnishing a 20 x 32 engine for the Akron Sewer Pipe Co.

INDIANA.

The nail mill of the Terre Haute Iron and Nail Co., at Terre Haute, has closed down indefinitely.

MISSOURI.

The Western Steel Co., St. Louis, are putting their "A" Furnace in shape, and expect to commence blowing early this month.

The Duggan-Parker Hardware Mfg. Co., St. Louis, will start up after the holiday rest from one end to the other of their large works. They have orders enough already in hand to last them for four months.

The St. Joseph Lead Co., of Bonne Terre, are turning out about two carloads of pig lead a day.

The American Barb Wire Co., St. Louis, are running every machine in their factory until 10.30 o'clock at night. In December their shipments were probably twice as large as ever before in a single month. A similar stage of activity prevails at the Benton Wire Works, in the immediate vicinity.

The Missouri Malleable Iron Co., St. Louis, have half of their yearly capacity already under contract, and are contemplating a further enlargement of their molding floors. Several of their contracts for 1886 are of large proportions.

The Moran Bolt and Nut Mfg. Co., St. Louis, did not stop for the holidays, and this week will operate with a full force and under advanced prices. The advance on machine bolts, lag screws and the like amounts to about 10 per cent., and was made necessary by the improvement of iron values.

The Heine Safety Boiler Co., of St. Louis, have sold eight Heine steel boilers, of 320-horse-power each, to the Troy Iron and Steel Co., Troy, N. Y., also two boilers of 75-horse-power capacity to the same company, who are building a new blast-furnace plant in addition to their other works near Troy, in which the large boilers are to be used. The boilers are now being made by James P. Witherow, at New Castle, Pa.

The McDonald Rolling Mills, of St. Louis, have completed an order for 2000 car axles for the Missouri Car and Foundry Co., and are working on one from the St. Charles Car Co. for axles for the 700 cars now building for the Atchison, Topeka and Santa Fe Railroad.

MICHIGAN.

E. T. Barnum, founder of the E. T. Barnum Wire and Iron Works, Detroit, recently destroyed by fire, issues circulars to the trade informing them of his continuance in the business under his own name, intimating that he is his own successor and is now prepared to fill with promptness orders sent him.

ILLINOIS.

One of the Joliet furnaces is in blast, and the other is out, being relined.

The North Chicago Rolling Mill Co., in adjusting wages at the North branch mill for this year, adopted the sliding-scale system

It is reported that a new blast furnace is to be erected at Golconda.

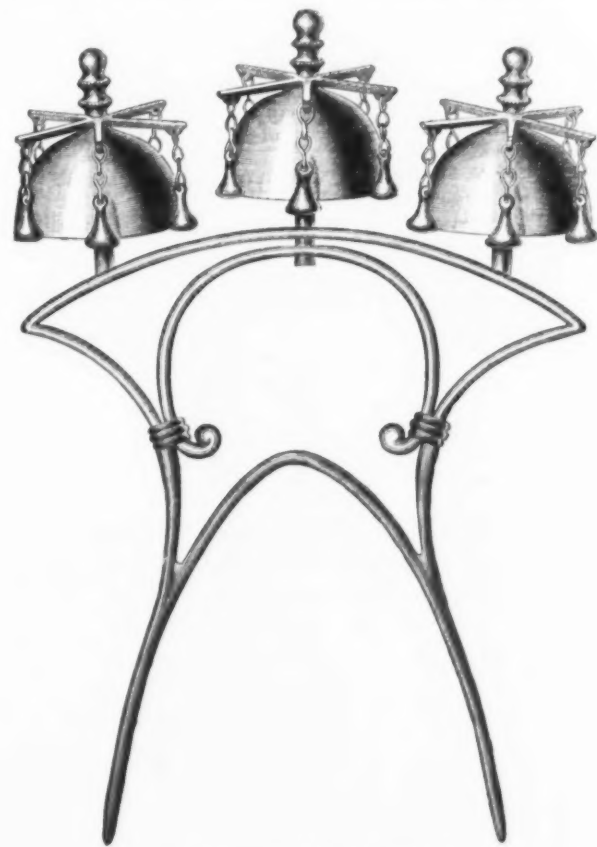
The report circulated to the effect that the North Chicago Rolling Mill Co. were to manufacture coke is without foundation. The company state that they have recently purchased 800 acres of land in the coke region of Pennsylvania in order to protect themselves in case of an emergency. The North Chicago mills of this company are running full time, the output being between 500 and 600 tons of steel rails daily. At their South Chicago plant only the blast furnaces are in operation, but Manager Park says he expects the center plant to be in full operation in about six weeks.

The building Nos. 15-17 South Canal street, Chicago, was damaged by fire and water to the extent of about \$1000 on the night of the 6th inst. Messrs. Benjamin & Fischer, woodworking machinery, and Haliday, Litchfield & Co., saw sharpeners, had their offices and salesrooms in the building. Their damage to office furniture and stock, principally by water, will net \$1500 to \$2000; fully insured.

Messrs. Pickands, Brown & Co., Chicago, pig iron and iron ore, have removed to their new office, Rooms 6, 7, 8 and 9 in the Illinois Bank Building, Nos. 111 to 117 Dearborn street.

Mr. B. T. Bacon, formerly with Rogers, Brown & Co., is now representing Messrs. Pickands, Brown & Co., of Chicago.

Mr. R. H. Lewis, lately of the Lake Erie Iron Co., Cleveland, Ohio, has succeeded Mr. D. H. Bradley as vice-president and general manager of the Calumet Iron and Steel Co., at Cummings, Ill., with his office in the First National Bank Building, Chicago. Mr. Daniel P. Eells purchased Mr. Bradley's interest in the company and has been elected



Wooding's Improved Swiss Hame Chime.

president. We learn from Mr. Lewis that they now have in operation 32 nail machines, and are making as good nails as when the machines were in the hands of the old nailers. No definite plan has yet been decided upon in regard to starting the remainder of the works.

One of the furnaces of the Union Iron and Steel Co., Chicago, was put in blast on the 24th ult. The furnace has a capacity of about 100 tons per day on Bessemer coke iron. Messrs. Pickands, Brown & Co. will have the exclusive sale of the product.

ALABAMA.

The Round Mountain Iron and Coal Co. have been reorganized at Tusculum, with W. C. Sibley, of Augusta, Ga., president. The capital stock has been increased from \$100,000 to \$185,000.

The completion of the Sheffield and Birmingham Railroad to Russellville, 17 miles from Sheffield, by the 15th of this month is promised.

The capital stock of the Capital City Water Co., at Montgomery, who are build-

and the 13 days succeeding. The minimum price demanded is \$1.25 an acre, and it is asserted that a pool has been formed to buy all the lands at this figure.

TENNESSEE.

The Dayton Coal and Iron Co. have just completed an immense coal bunker near their coke ovens, which will hold 15,000 tons of coal. Their new engine-house is well under way. It will be 140 feet in length. They have 242 coke ovens completed, thoroughly dried and ready for firing.

La Grange Furnace (charcoal) blew out December 25th.

WEST VIRGINIA.

A co-operative nail mill is to be established at Wheeling.

The steel plant of the Riverside Iron Co., at Wheeling, has shut down for an indefinite period.

TEXAS.

The Old Alcala Blast Furnace, owned by the State, and one of the principal industries of the Rusk Penitentiary, is now in successful operation under State management. Mr. R. A. Barrett, who superintended the construction of this furnace for Mr. E. C. Darley, whom the State contracted with to build it, is now the manager. The furnace is making 30 tons of pig iron per day.

Hardware Novelties.

Wooding's Improved Swiss Hame Chime.

This article is manufactured by the Chapman Mfg. Co., Meriden, Conn., whose line of Swiss and Russian sleigh bells, chimes, &c., is known to the trade. Its appear-

ance is represented in the accompanying illustration and the following points are made by the manufacturers in connection with it: That it is very easily adjusted, being held in place by the hames, and will fit any size or style of horse collar; that it is out of the way in blanketing the horse, and that it has something of a Russian appearance when in use. The manufacturers allude to the fact that there has been for the past few years a demand for a hame chime for sleighing turnouts, and also for work teams, but that the difficulty has been to make one that would fit all kind of hames, an objection which has been overcome by the one here described. The same manufacturers are about to put on the market a cheap hame chime on the same principle, intended for use with work teams, the price of which will be about half that of the style they are now making.

Adjustable Towel Bracket.

The Wire Goods Co., of Worcester, Mass., announce a new towel rack which they are about introducing to the trade, and of which



Adjustable Towel Bracket.

which has been in vogue at their South Chicago mill during the past year. Rollers and all other ton men at the North branch mill have been advanced 12 per cent. on last year's prices, and carpenters, machinists, laborers, &c., at both mills received a voluntary advance of 10 per cent. The mill at South Chicago is shut down for repairs.

The Bush Nail Works is a new concern recently started by Mr. Lewis Bush, at South Chicago. He has now in constant operation four nail machines with automatic feeder attachments, producing about 30 kegs per day, all steel.

Frank Chadwick, formerly with F. O. Marsh & Co., is now representing Messrs. Charles Himrod & Co., of Chicago, as pig-iron salesman.

ing water works under contract with the city, has been increased to \$300,000. The old water company are trying to enjoin this contract on the ground that the city is not able to pay both companies.

Preparations are in progress for a change from the 5-foot to the standard gauge on the Memphis and Charleston Railroad.

The Pratt Coal and Iron Co., near Birmingham, have just received from the Baldwin Locomotive Works, of Paterson, N. J., a large Consolidation railroad locomotive, the only one in all its section of country.

A sale at Montgomery of mineral lands of the Government in Alabama, set for some time this month, has been postponed by proclamation of the President to April 22

an illustration is given herewith. It is a rod of brass or of plated wire suspended between two braced screw supports, as shown in the cut. The screw-eye that holds the rod forms the screw to attach the support to the wall. In putting up the rack no screws or screw-drivers are required, and the manufacturers refer as points in its favor to its tasty appearance, and the fact that it can be made at a lower price than many other designs. The prices at which it is sold were given in our issue of the 31st ult. It is made in three styles—No. 82, brass, with black enameled base; No. 182, nickel-plated, with black enameled base, and No. 282, nickel and tin finish, with white-wood base—and each of these styles is made in 14, 16 and 18 inch sizes, the measurement indicating the total length inside of supports.

MECHANICAL.

Murdoch's Locomotive, 1781.

We learn from an English paper that there is now on exhibition in the Birmingham Corporation Art Gallery, England, the original model three-wheeled locomotive made by William Murdoch in 1781. The model is the property of Mr. Richard Tangye, who recently purchased it for a large sum, and has now lent it for exhibition. This engine of Murdoch's, although constructed three years previously, was laid aside till 1784, when Watt's patent included it. Watt appears never to have viewed the locomotive with favor, as even long afterward he feared that the high pressure of the steam would be unsafe in such boilers as were then possible. In 1784, however, when Murdoch was at Redruth representing the firm of Boulton & Watt, he utilized his leisure to improve and complete his locomotive, and the story is well known how, one dark night, he took it out upon the highway, and, getting up steam, horrified the vicar and his wife, who, returning from Redruth, were "startled by a fizzing sound" and the sight of a strange monster rushing along the lonely road "in a zigzag way." This model, made on the eve of such a vast railway system as now exists, is therefore singularly interesting, and connected with it is the curious fact that Trevithick, 13 years later, also ran his first road locomotive at Redruth.

Boiler Power.

The term "horse-power," says the *Locomotive*, has been applied to boilers, and has been so long used in connection therewith that it will probably "stick," so we must make the best of it. This can only be done by assuming some standard evaporative power for a measure, and rating boilers accordingly. Such a standard, one with which no fault can be found, and which represents very closely the power which will be yielded by a boiler when the steam furnished by it is used in an ordinary good steam engine, was recommended by the judges at the Centennial Exposition in 1876. This standard is: The evaporation of 30 pounds of water per hour from feed-water having a temperature of 100° F., into steam having a pressure of 70 pounds per square inch above the atmosphere, is equal to 1 horse-power. This differs by only about one-thirtieth of 1 per cent. from an evaporation of 34½ pounds of water per hour from and at 212° F., which is the standard for 1 boiler horse-power recommended by a committee appointed by the American Society of Mechanical Engineers to consider the subject; hence, the two standards are practically the same. But the feed temperature and steam pressures are constantly varying in practice, so that it becomes necessary to have recourse to calculation to compare results. To facilitate this comparison we have computed the following table, which gives the equivalent evaporation from feed at 100° into steam of 70 pounds pressure, for various other pressures and temperatures occurring in practice. A single example will show the application of the table:

Table Showing the Equivalent Evaporation from Feed at 100° into Steam of 70 Pounds Pressure for Various Other Pressures, and Temperatures of Feed-Water.

Temperature of the feed-water.	Pressure in pounds per square inch above the atmosphere.															
	0	10	20	30	40	50	60	70	80	90	100	120	140	160	180	200
32.....	1.033	1.04	1.046	1.05	1.053	1.055	1.056	1.059	1.061	1.063	1.064	1.066	1.068	1.071	1.073	1.076
40.....	1.035	1.038	1.041	1.043	1.045	1.047	1.048	1.051	1.053	1.055	1.056	1.058	1.061	1.063	1.065	1.068
50.....	1.038	1.041	1.044	1.046	1.048	1.05	1.051	1.054	1.056	1.058	1.059	1.061	1.064	1.066	1.068	1.071
60.....	1.041	1.044	1.047	1.049	1.051	1.053	1.054	1.057	1.059	1.061	1.062	1.064	1.067	1.069	1.071	1.073
70.....	1.044	1.047	1.05	1.052	1.054	1.056	1.057	1.06	1.062	1.064	1.065	1.067	1.07	1.072	1.074	1.076
80.....	1.047	1.05	1.052	1.054	1.056	1.058	1.059	1.062	1.064	1.066	1.067	1.069	1.072	1.074	1.076	1.078
90.....	1.05	1.053	1.055	1.057	1.059	1.061	1.062	1.065	1.067	1.069	1.07	1.072	1.075	1.077	1.079	1.081
100.....	1.053	1.056	1.058	1.06	1.062	1.064	1.065	1.068	1.07	1.072	1.073	1.075	1.078	1.08	1.082	1.084
110.....	1.056	1.059	1.061	1.063	1.065	1.067	1.068	1.071	1.073	1.075	1.076	1.078	1.081	1.083	1.085	1.087
120.....	1.059	1.062	1.064	1.066	1.068	1.07	1.071	1.074	1.076	1.078	1.079	1.081	1.084	1.086	1.088	1.09
130.....	1.062	1.065	1.067	1.069	1.071	1.073	1.074	1.077	1.079	1.081	1.082	1.084	1.087	1.089	1.091	1.093
140.....	1.065	1.068	1.07	1.072	1.074	1.076	1.077	1.08	1.082	1.084	1.085	1.087	1.09	1.092	1.094	1.096
150.....	1.068	1.071	1.073	1.075	1.077	1.079	1.08	1.083	1.085	1.087	1.088	1.09	1.093	1.095	1.097	1.099
160.....	1.071	1.074	1.076	1.078	1.08	1.082	1.083	1.086	1.088	1.09	1.091	1.093	1.096	1.098	1.1	1.102
170.....	1.074	1.077	1.079	1.081	1.083	1.085	1.086	1.089	1.091	1.093	1.094	1.096	1.099	1.101	1.103	1.105
180.....	1.077	1.08	1.082	1.084	1.086	1.088	1.089	1.092	1.094	1.096	1.097	1.099	1.102	1.104	1.106	1.108
190.....	1.08	1.083	1.085	1.087	1.089	1.091	1.092	1.095	1.097	1.099	1.1	1.102	1.105	1.107	1.109	1.111
200.....	1.083	1.086	1.088	1.09	1.092	1.094	1.095	1.098	1.1	1.102	1.103	1.105	1.108	1.11	1.112	1.114
212.....	1.087	1.09	1.092	1.094	1.096	1.098	1.099	1.102	1.104	1.106	1.107	1.109	1.112	1.114	1.116	1.118

Suppose we have a boiler which evaporates 2400 pounds of water in one hour from feed at 70° into steam at 80 pounds per square inch, what is the equivalent evaporation from 100° into steam of 70 pounds? Looking in the first column under "Temperature of the Feed" we find 70; following along the horizontal line from this point until we reach the line of pressures having 80 at the top we find 1.029; multiplying this by 2400 we have 2469.6 for the equivalent evaporation from 100° at 70 pounds, and the nominal horse-power of the boiler would be, by the Centennial committee's standard, 2469.6 ÷ 30 = 82.3 horse-power, and similarly in any other case.

Riveting Boilers.

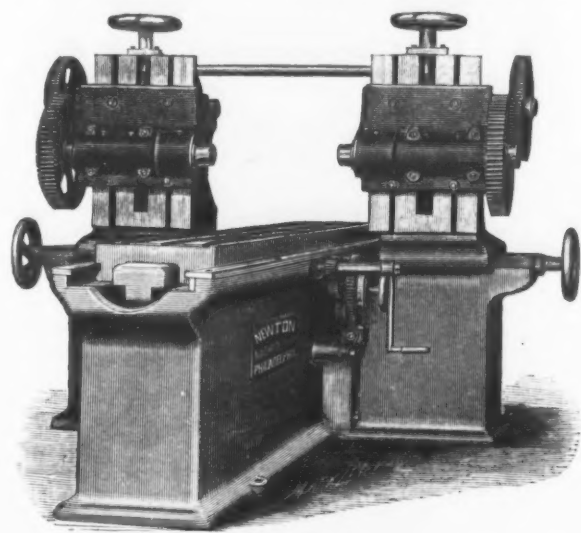
It is gratifying to note that the important question of riveting is beginning to receive the attention from boiler-makers that it deserves. Very few years ago boiler-makers, almost without exception, riveted their plates in exactly the same manner that it was done 50 years ago. The pitch for every thickness of plate was about 2 inches, and it was the same for both single and double riveted joints. Referring to this point, the *Locomotive* says:

We have long urged that this practice was wrong, both theoretically and practically, but were met by the boiler-makers with the ancient argument that it was impossible to make a tight joint with pitches of over 2 inches; and as to double riveting, why, two rows of rivets were, of course, twice as strong as one row. This is true, so far as the rivets were concerned; but when one row is stronger than the plate section left after punching the holes, the utility of the second row is evidently more apparent than real. As to the impossibility of making tight joints with rivets spaced over 2 inches apart we can only say, let those who have tried the wider pitches decide the question. We will, however, give the testimony of two foremen, boiler-makers, one of whom is at the head of the boiler shop of the largest locomotive building establishment in the world, and the other at the head of a large iron works in New England. They both agree upon the point that where a wide pitch is used it is not only easier to make a tight joint, but it is easier to keep it tight under the conditions of every-day use. To the truth of this latter statement we can

bear witness ourselves. We can also add that in the last-mentioned shop, where we inspect and test by hydrostatic pressure all the boilers sent out, we find invariably tighter joints on new work when the pressure is applied than we do anywhere else. At this shop the pitch for longitudinal double-riveted seams in five-sixteenths and three-eighths plate is about 3¼ inches. The riveting is all "button-set." Many boiler-makers will claim that good work cannot be done with the "sett," but, with all due respect to their skill and experience, we must say that when a man makes such a statement he simply pleads ignorance or his own want of skill.

Duplex Milling Machine.

A new duplex milling machine, shown in the annexed cut, has recently been put on the market by the Newton Machine Tool



Duplex Milling Machine.—Built by the Newton Machine Tool Works, Philadelphia, Pa.

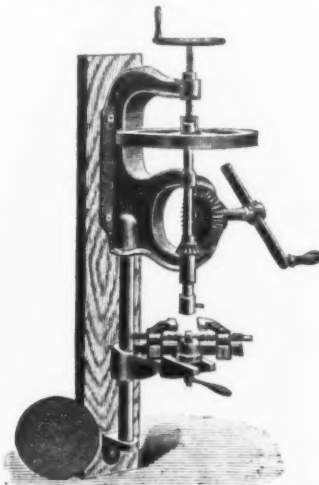
Works, of Philadelphia, Pa. The machine is made specially for work where parallel sides are to be finished. It is provided with two adjustable spindle-heads having both vertical and horizontal adjustment, by means of which cutters of any desired shape, size or profile may be used. The spindles, which are very heavy, are driven by compound back gears, and have three changes of speed. The operation of the machine is very simple. Work to be milled which has parallel sides is placed in proper holders on the carriage, and the spindle-heads are adjusted so that the face-cutter in each spindle is brought to bear on each side. Work milled in this manner is perfectly parallel and of much better finish than when done on a planer, the cost being, moreover, reduced. The cutters with inlaid teeth, used in face milling, can be ground and sharpened until the teeth are worn away, when they can be replaced at small cost. For

face is constantly presented to the piston-rod. Its object, it is readily understood, is to prevent the possibility of the rod becoming scored, or wearing oval, or in any other way "out of truth." It also reduces the friction between the rod and packing to very much less than where the ordinary fixed stuffing-box is used. This is accounted for by the fact that the box is so constructed and attached to the cylinder cover as to allow a certain amount of lateral movement, so that instead of, as usual, the packing being nipped sufficiently tight to spring after any sideways movement of the rod, the whole stuffing-box, with gland and packing, is free to slide to and fro on the ground face at its base. The only misgiving felt in making the first was that there might be some difficulty in keeping the joint between the bottom of the stuffing-box and the cylinder cover steam and water tight, or that

machine from spreading. This latch (not shown) is hinged to the upper bar, and swings out of the way for inserting and removing the work from the machine. Each machine is provided with four rolls for wide, medium and narrow locks and a smooth one for inside locks. The horn may also be provided with more than one groove, if desired.

The Every-Day Post Drill.

The Every-Day Post Drill, of which we present an engraving, is made by the M. L. Edwards Mfg. Co., of Salem, Ohio. The simplicity of the tool and the ready explanation of its arrangement furnished by the cut make a lengthy description unnecessary. As the fly-wheel has an increased speed above the crank-shaft and is directly attached to the drill-spindle below the feed-screw, its weight, moreover, being on the drill-bit, the tool is easily operated. The attachment of the fly-wheel as shown is a new feature in drilling machines, and is an advantage over the methods commonly adopted. The adjustable crank adapts it for use on a variety of work. The table has ample vertical adjustment, and will swing to the right or left, and is always in line with the drill-spindle. For drilling tires the round table, shown at base, and vise may be removed and the main slotted table used. The vise is simple in its construction, readily adjusted, and will grasp 5 inches. It is a very desirable device for holding work, leaving the operator free to feed at will, thus avoiding the complications of a self-feed, which for general work is impracticable and seldom used. The drill is 40 inches



The Every-Day Post Drill.

high, its shipping weight 100 pounds, and it will drill from ½ to 1 inch and 3½ inches deep. It swings 15 inches.

Economy of Feed-Water Heaters.

The saving of fuel effected by applying a good feed-water heater is astonishing. Assuming that boilers are required to furnish 100 horse-power for 10 hours per day for their reasonable life, say 15 years, and that 4 pounds of coal are required per horse-power per hour, and we assume 300 working days per year, which will be 4500 days for 15 years, then 100 horse-power at 3 pounds per hour is 3000 pounds of coal per day of 10 hours, and 15,000,000 pounds for the 15 years, which at ¼ cent per pound is \$45,000. Now, suppose we can save a paltry 5 per cent. of this (there are many who would not consider this worth looking after), and we get \$2250, enough to buy nearly 200 horse-power of boilers; then call it 500 or 1000 horse-power, and the saving would be \$11,250 and \$22,500, enough in the latter case to buy fuel enough for 50 horse-power for 15 years. The amount of fuel that can be saved by heating the feed-water by the exhaust steam is shown by the fact that 1 pound of water must be converted into steam to heat about 5½ pounds from 32° up to 212°.

Therefore, 100 horse-power, at 30 pounds of water evaporated per hour per horse-power, would be 3000 pounds per hour, and 30,000 pounds for 10 hours; and to raise this water from 32° to 212° will require 1 pound addition for every 5½ pounds, and we get 5545 pounds of water to be evaporated in excess of what would be needed for 100 horse-power if the water was heated up to 212° by the exhaust steam from the engine; and if the boilers would evaporate 7 pounds of water from 32° under 70 pounds pressure, to 1 pound of coal, we should have to evaporate without the heater 35,545 pounds of water; and this divided by 7 gives 5077 pounds of coal required in this case, and with the heater 30,000 pounds of water to be evaporated; this, divided by 7, gives 4285 pounds of coal—a saving of 792 pounds of coal for 100 horse-power, 10 hours—about 15 per cent., which is not quite accurate for these conditions, but very near it, and is the simplest way to show to all the advantages of heating feed-water by the exhaust steam from the engine. This should awaken those who are pumping cold water into their boilers, or heating it by steam taken directly from the boilers, to the advantage and saving of fuel by using a good feed-water heater. To this direct economy in fuel should, moreover, be added the saving effected by purifying the water.

Steam-Boiler Furnaces.

From time to time new furnaces or systems of combustion are brought to the notice of steam users. It is invariably claimed for these that they prevent the evolution of smoke and save fuel. Sometimes it is asserted that they save fuel because they prevent smoke, but this is not invariably stated. Sometimes only economy of fuel is claimed, the reduction or prevention of smoke being thrown in as an extra, so to speak. In other words, the merit of the new furnace is based solely on its powers of preventing smoke, and a saving in fuel is suggested as something which the inventor presents gratis to the purchaser or user. It can scarcely have failed to strike the intelligent observer, however, that chimneys smoke just about as much as they have done at any time during the last 50 years.

Indicating the Power of a Belt.

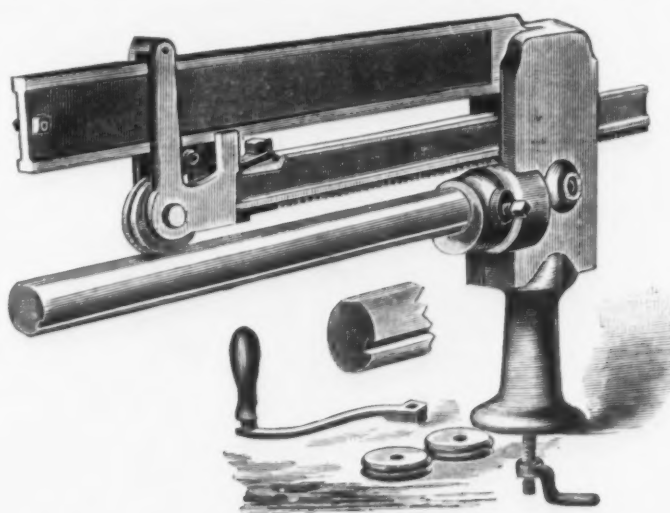
According to an account which we saw some time ago, one way to indicate the power of an engine or the work that is being performed by a line of shafting is to indicate the load that is being transmitted by the driving belt, by attaching an indicator that will record the varying tensions throughout every portion of the belt, and make use of the mean effective strain, as in the pressure of the steam within the cylinder of the engine. This, however, requires a different indicator than the one which is found in the engine-room. For those who may consider the working with an indicator card as only an exponent in the computation of the amount of horse-power it would be well to examine this method, as the mean effective driving force is to be taken from a card that is not connected with the cross-head of the engine by a drum card and a reducing motion, but is driven independently by itself under its own uniform motion. This attachment consists of a wide elliptical spring, bent up at the ends so as to hook into the lace-holes of the belt, and connected by simply removing the lacing during the experiment. This brings the tension on each end of the spring, tending to draw it out into a straight line and changing the position of a pointer that connects the two ends of the spring, so that a slight movement of the spring, fastened at one end of the long arm of the pointer, will cause the pencil point to travel an arc of a circle. This arc nearly approaches that of a straight line, owing to the elliptical form of the spring. The drum that records the movement of the pencil point is driven by means of a coiled spring which is passed to the shaft on which the drum is supported, and turns uniformly by overcoming the resistance of a fan wheel. The indicator card is wrapped about the drum, with one end overlapping the other in a direction the pencil is tracing on its surface, when the machinery may be set in motion, provided room has been made for this outside attachment to pass through the belt-holes and under the beams and sleepers of the flooring. A card is given that offers a very interesting study. When the instrument has been adjusted and the drum allowed to turn slowly with a constant speed, the driven pulley can be blocked and the tension on the slack side recorded while the driving-wheel is slipping on the belt. This will give the least tension that the belt will be subjected to during the transmission of power. The indicator can be brought on the other stretch of the belt and the pulley turned in the opposite direction till the lowest tension has been recorded. An irregular line between the two straight ones thus obtained represents the card that is taken while the belt is in motion, and it shows the variation in the tension in the belt while passing over the pulleys if the indicator is to be relied upon, and with a scale that has been divided in accordance with the power of the spring. The difference in the tension at the horizontal portions on the advancing and returning sides may be measured and this force taken as the mean effective driving-power of the belt, which, in connection with the number of feet the belt travels a minute, will easily bring a result from which the horse-power can be determined.

The usual nonsense about priority of invention has attacked the incandescent lamp. It is claimed for Belgium that in 1838 Jobard, of Brussels, proposed as a source of light a small carbon in an exhausted receiver, and rendered luminous by means of an electric current. De Chanzy in 1844 repeated these experiments, and patented the divisibility of the electric light. About the same time Starr, of Cincinnati, constructed a lamp with a platinum wire, which King afterward replaced by a filament of carbon. Staitte employed iridium in 1848, and in 1859 Du Moncel indicated the different tissues that, when carbonized, gave the best effects of incandescence. Finally, M. Sponzée, on November 5, 1879, obtained a patent in which, it is claimed, are given all the essential conditions for the glow lamp as now known, as to the kind of carbon employed, the form and section of conductor, the means for its preservation, and the nature of the receiver or globe. It is always the case when a man succeeds in overcoming the practical difficulties that men of generalities come forward and say the same thing was done by so-and-so, though it is rarely true.

On the subject of imprisonment for debt an accepted legal textbook says: "It is well known that the cases in which an execution may issue against the body of a defendant have been very materially diminished by statutes enacted during the present century, both in this country and in England. Such executions may, nevertheless, issue in many cases. The statutes on the subject are by no means uniform. Most of them authorize an execution against the body of the defendant whenever he has been found guilty of a fraud, or tort, or of misconduct in office or in a professional employment, or of the embezzlement or conversion of the plaintiff's property; and also where the defendant is about to abscond, or where he has disposed of or is about to dispose of his property for the purpose of defrauding his creditors; and also where he has property which he conceals and refuses to apply to the satisfaction of a judgment against him. (Freeman on Executions, Sec. 451.)" The above extract describes in outline the law of New York as well as that of other States on the subject.

M. Eitner proposes in the *Revue Industrielle* this simple method for testing the quality of the leather used for belting: "A small piece is cut out of the belt and placed in vinegar. If the leather has been perfectly tanned, and is therefore a good quality, it will remain immersed in the vinegar, even for several months, without any other change than becoming a little darker in color. If, on the contrary, it is not well impregnated with tannin, the fibers will promptly swell, and after a short time become converted into a gelatinous mass."

The greater part of the coal now consumed by the French navy is in the form of briquettes. The same form of fuel is largely used in the merchant service, and is rapidly growing in favor.



New Groover for Tinware.

applied to both ends of the arbor, when work is milled in the ordinary way. The heads are bound together by a rod running across the top and sliding through the heads when adjustment is desired. When the heads are set ready for work the set-screws which hold the rod are tightened and the heads are rigidly held. This insures great accuracy, especially when milling with face-cutters.

A Revolving Stuffing-Box.

A novelty in steam-engine details recently introduced in England consists of a rotating stuffing-box, by means of which a new sur-

smaller than 2 inches by removing the horn or mandrel and replacing it with one of proper size. The horn is held in position by a set-screw. It has a flat surface its entire length for grooving ordinary work where the seam is to be on the outside. It also has a groove of medium width, and by turning the horn so that the groove will be up, and changing the roll on the rack-bar for a smooth one, the groove will be formed on the inside of the work. The machines are made in three sizes, viz., 17, 20 and 30 inches long. The 30-inch machines have a locking latch on the end of the upper bar that connects with the horn to prevent the

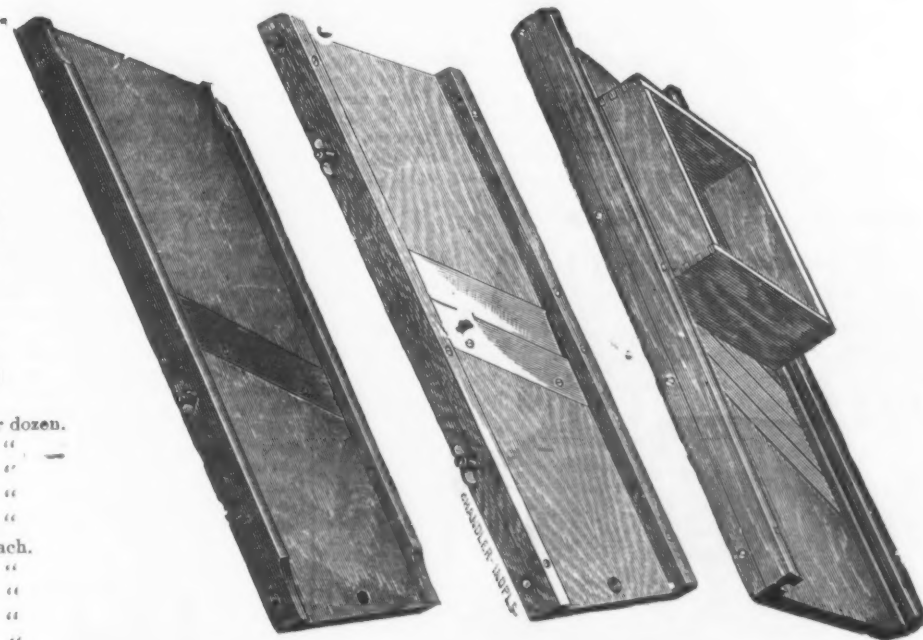
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" 3.....	3	" " " "
" 4.....	4	" " " "
" 5.....	3	" " 9 x 30, " "
" 6.....	2	" " 12 x 36 each.
" 7.....	3	" " " "
" 8.....	4	" " " "
" 9.....	3	" " 12 x 40, " "
" 10.....	4	" " " "



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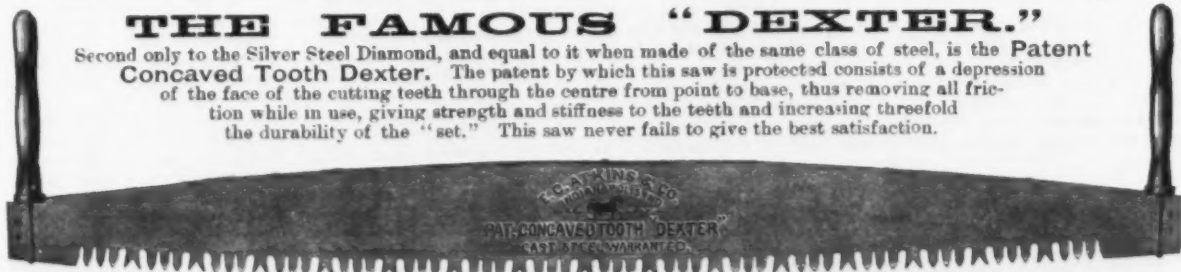
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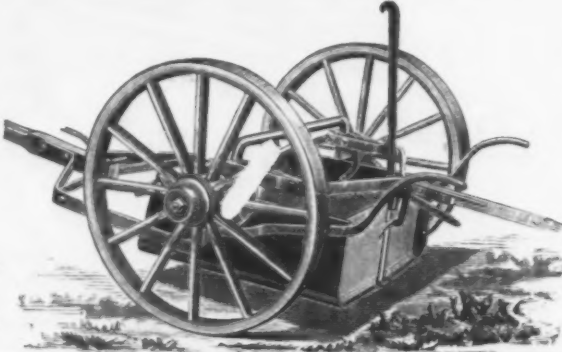
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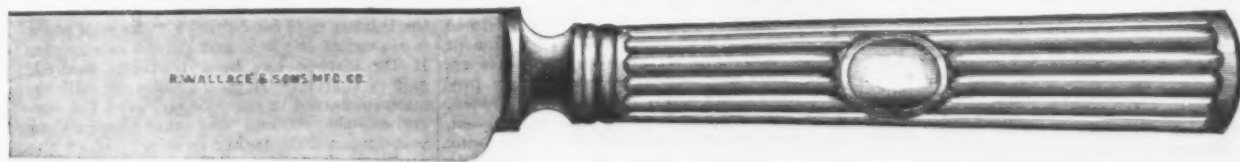
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The Iron Trade of Austria.

The general meeting of the Society of Austrian Mining, Iron, and Machine Industries was held at Vienna lately, and a report was read on the condition of the Austrian iron trade during the past year. Among the probable causes of the depression in this trade were especially named the heavy taxation to which the industry is subjected, and the enormous overproduction during later years. The report states that the production of pig iron, which amounted to 8,000,000,000 cwt. in 1879, rose to 15,000,000,000 cwt. in 1884, an increase of 93 per cent. Although it has been noted that consumption decreased considerably in 1883, the production of 1884 exceeded that of 1883 by 10 per cent. As a proof that the complaint against high taxes is justified, the report cites the balance of an Austrian mining society, which had to pay 1,200,000 florins of taxes out of profits amounting to 2,760,000 florins, so that 53 18 per cent. of the profits fell to the share of the proprietors, and 46.82 per cent. to the State. This state of things is all the more to be deplored, because foreign competitors, in Germany, for instance, pay in taxes only the fourth part of the amount paid in Austria. The report contains no other proposal for remedying this sad state of affairs except a protective duty, the higher duties imposed in 1882 having failed to produce any recovery.

Herr Bressart, the mining engineer of the State Railways in Austria, in a report upon the present condition of the iron and steel manufactures of Austro-Hungary, states that despite the duty of \$3.75 a ton upon wrought iron and \$13.50 a ton upon steel rails, &c., the competition of German firms has hitherto been very severe. The home industry is now, however, better able to take care of itself, and the number of blast furnaces, which was only 270 ten years ago, has now been much increased, those in Carinthia and Styria being fed with charcoal and turning out some of them as much as 10,000 tons of iron per annum. Altogether, Austria and Hungary manufacture about 500,000 tons of iron a year, the chief blast furnaces being in Styria, Carinthia, Bohemia, Moravia, Silesia, Upper Hungary, Croatia, and Transylvania. There are twelve Bessemer steel works and five Martin-Siemens steel works, nearly all of which are equipped for making steel rails; there are only five manufactures for making steel tires and as many for making locomotives, of which about 400 are turned out in the course of the twelve-month, this being quite enough for the 12,500 miles of railway open for traffic in the dual Kingdom.

TRADE PUBLICATIONS.

The Colliu Furnace.

The Colliu furnace is illustrated and described in a small pamphlet recently issued by the Colliu Furnace Co., of Detroit, Mich. Details of the furnace are shown and interesting information concerning it is supplied. We find that, owing to frequent inquiries for a small, low-priced furnace, suitable for melting from 300 to 1000 pounds of iron, the company have completed arrangements for making a furnace of this capacity, which they style No. 60. Interesting testimonials and records of work are also given.

Blowers.

The Huyett & Smith Mfg. Co., of Detroit, Mich., have brought out some new circulars illustrating and briefly describing the well-known Smith pressure blowers, ventilating fans, &c. Practical suggestions and instructions relative to the management of the machinery, testimonials from various sources and tables of sizes and prices are also supplied.

Machinery for Hardware Manufacturers.

John Adt & Son, of New Haven, Conn., have issued a new catalogue devoted to machinery for hardware manufacturers. Many changes have been made in these machines since the preceding catalogue was sent out, and examination of the one now in hand will therefore be found to present some features of interest. Roll wire straighteners, wire reels and cutting machines, wire forming machines, presses, lathes and a large number of others are illustrated and briefly described.

The Wire Industry of Russia.—In the Governments of Moscow and Tver there are 680 wire-drawers, the value of whose output was estimated in 1881 at 368,000 rubles (\$184,000). Several of these establishments use machinery driven by horses, and employ from 30 to 50 workmen. The adult wire-drawer may make, but not always, from 40 to 50 copecks (20 to 25 cents) per day. In the Government of Moscow there are 580 kustars engaged in four industries based upon the wire industry, viz., the manufacture—at least the making—of pins, hooks, seives and sundry wares, such as mouse traps, &c. The value of their output in 1881 was 163,000 rubles (\$81,500). Consequent upon the introduction of perfected machinery these kustarian industries barely exist. In the making of pins the person who held the wire received from 10 to 60 copecks (5 to 30 cents) daily. A hook-maker received from 60 to 100 rubles (\$30 to \$50) a year, but, if working for a master who furnished him with food, then from 25 to 40 rubles (\$12.50 to \$20) was his yearly salary. A hired kustar working for a master, and making 3000 hooks per day, would make a profit to the master of 27 rubles 54 copecks (\$13.77) per year. These hooks being sold in Moscow at 40 copecks (20 cents) per 1000, and the cost of manufacture being 36½ copecks (18¼ cents), left a profit of 3½ copecks (1¾ cents) daily from each workman engaged in this industry.

According to the National Car Builder, locomotives have been increased in weight and size so much during the last 20 years, to keep pace with the demand for pulling heavy trains, that many master mechanics have been put to great inconvenience in providing houseroom for them. All sorts of

makeshifts have been resorted to in order to get the engines inside the short roundhouses. The inconvenience that American roads suffer from the increase in the length of locomotives appears, however, to be trifling in comparison to the inconvenience arising from the same cause in older countries. Mr. Stroudley, locomotive superintendent of the London, Brighton and South Coast Railway, in England, explained that his reason for designing locomotives without trucks was that the trucks lengthened the engine so much that they could not be turned on the tables of the road, and that at some places expensive property would have to be pulled down to make room for larger turn-tables.

SCIENTIFIC AND TECHNICAL.

Effect of Age on the Quality of Cement.

It has been ascertained from practical experience with hydraulic cements (of which we may take Portland and Rosendale as typical examples) that they gradually deteriorate in setting and hardening qualities by age, even when kept in dry situations. The material gradually absorbs moisture (even from the driest atmosphere) and carbonic acid, and chemical changes take place in it analogous to those which take place when it is made into mortar for use. The longer the cement is kept the greater will be the extent of these changes, and consequently the greater the extent of the deterioration. Ultimately a cement may become quite useless from these causes. A certain amount of air-slaking, however, is beneficial to certain qualities of Portland cement. The latter, especially, when underburnt, very frequently contains an excess of free caustic lime, which, when the cement is used immediately after its manufacture, causes it to swell very considerably and sometimes destroys the masonry in which it is used. To avoid this very common danger English architects and engineers usually open at once the bags of Portland cement sent from the manufacture to the work, and empty the contents on the floor of a room, leaving them there exposed to the air, and perhaps turning them occasionally, for about a month before use. The dry cement, if fresh, swells under this treatment, from the hydration of the particles of caustic lime. When it has become so far air-slaked that a little of it, made into a stiff paste with water, and put into a bottle, will not expand enough to burst the bottle, it is considered to be in proper condition for making mortar. If the air slaking is carried beyond this point the cement powder gradually loses its power of setting, and at last becomes as inert as so much fine sand.

Steel-Copper Electric Conductors.

Referring to compound telegraph wires, consisting, as is known, of copper deposited upon iron or steel, we find it stated that a wire is now being brought out in England in which the relation of the two metals is reversed, the steel surrounding the copper. The wire is said to be drawn from compound metal consisting of a hollow ingot of steel filled with copper.

The Calorific Value of Coal Gas.

The average heat value of well-purified coal gas at constant volume has been recently determined by M. Witz at about 5200 calories per cubic meter at 0° and 760 mm. when the water formed is fully condensed. This value, got from a great variety of experiments with gas from different works, appears to make the generally-accepted figure of 6000 calories about 15 per cent. too high, and the calculation of gas motors is here concerned. The heat value of the gas from one and the same works varied in the course of a year from 4719 to 5425 calories, which was more than the variation between different works. The influence of temperature and external pressure was not perceptible. The operations for purifying gas diminish the heat effect sometimes as much as 5 per cent. The gas of the last hour of distillation is, contrary to the usual view, less rich than that of the first hour. Dilution with oxygen lessens the heat value, but in dilution with air, curiously, no such effect was observed; the heat of combustion was the same with six or with ten volumes of air.

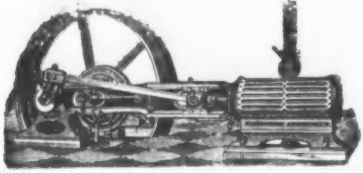
Carbonic Acid in the Air.

The amount of carbonic acid in the air has recently been measured by MM. Spring and Roland in a series of 256 determinations in the course of one year, the place being at Liège, in Belgium, having on one side a busy center of the iron industry and on the other an agricultural district. The average obtained was 5.1258 parts by weight and 3.3526 parts by volume in 10,000 parts of air. This is considerably more than the air of Paris contains (4.83 and 3.168 respectively). Besides the plentiful carbonic acid from those iron works there is a large emission of gas from the ground, which is rich in coal; indeed, cases of local heating often occur, with withering of the plants. To the relative abundance of carbonic acid the authors attribute the greater heat of Liège as compared with the surrounding regions, as the gas strongly absorbs heat rays and limits radiation by night. A return of cold in May is thought to be due to the unfolding leaves diminishing the amount of carbonic acid, so that the nightly radiation is increased. The amount of carbonic acid is considerably increased by a fall of snow (to 3.761 ten-thousandths parts by volume), except when the earth is already covered with snow. Cloud also gave an increase (3.571). The winter months gave a greater amount than the summer. The difference between day and night was but slight, nor had temperature nor rainfall a decided effect; but the rain in thunderstorms increased the amount. As to wind there were three maxima, viz., with north, northwest and south-southwest winds, corresponding, apparently, to the directions of industrial centers. The carbonic acid diminished in high winds and increased with a high barometer. These researches are the subject of a recent memoir to the Belgian Academy.

A Wire-Rope Tramway for Hauling Timber.

An interesting application of the use of a wire tramway for hauling timber was brought before the Technische Verein von

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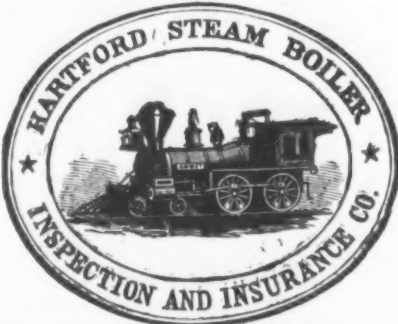


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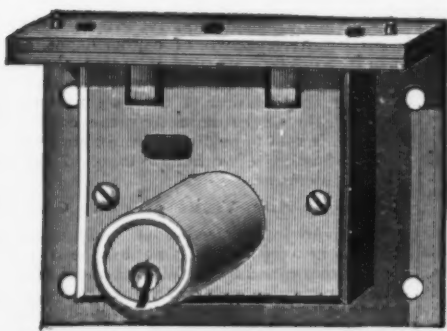
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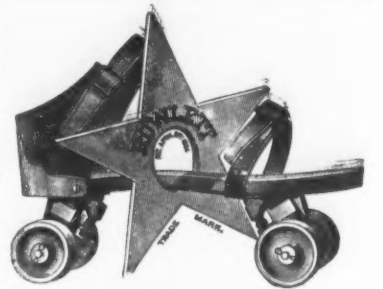
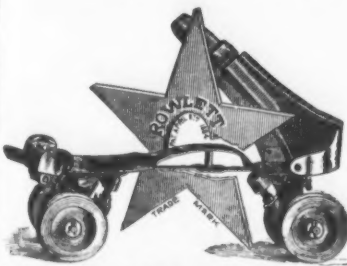
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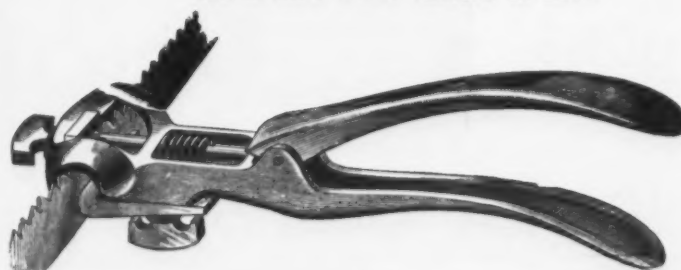
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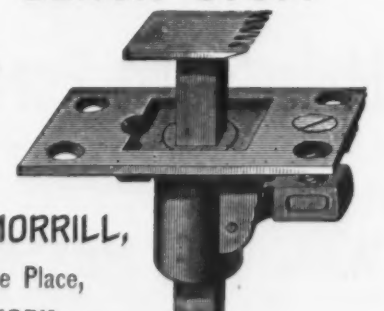
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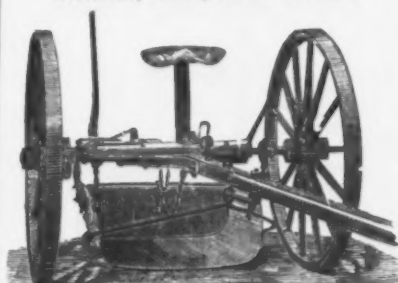
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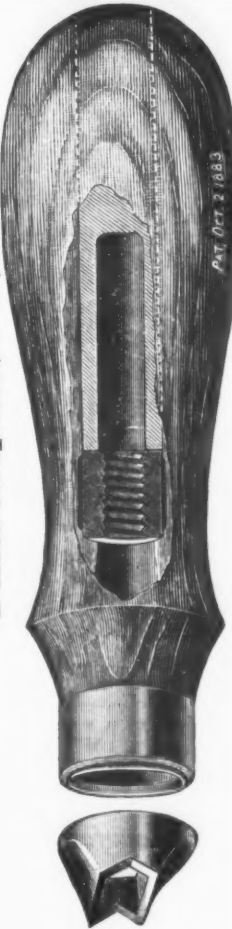
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New York by Mr. W. Hildenbrand, who is well known in connection with this class of work. G. Donaldson & Co., of Richmond, Va., built a sawmill on the left bank of New River, W. Va., near Sewell, and applied to John A. Roebling's Sons Co., of Trenton, N. J., to solve the problem of carrying the lumber across the New River from the left bank to the Chesapeake and Ohio Railway, located on the right bank. The distance between the railroad track and the station on the other side of the river, located at considerable elevation above it, is in a bee line 1507 feet. The span of the carrying wire rope is 1466 feet, the difference in elevation being 466 feet. The towers at both ends, upon which the carrier-rope rests, are made of 12-inch oak timber, the towers being thoroughly anchored. The carrier-rope is 2 3/4 inches in diameter, 114 wires, weighing 9 pounds to the foot. The timber, which is exported to England, is 20 feet long, 12 inches by 5 inches, weighing 72 pounds per cubic foot. It must be carefully handled. It is loaded on a cage consisting of two iron I-girders capable of being moved apart, so that they reach around the timber and can be locked under it. It is carried on five wheels which rest on the carrier-rope, and which are placed in a line representing a gentle curve, so that the rope is not bent too much. The cage is drawn by an endless 3/4-inch wire rope driven by an engine at the upper station. While the sharp grade is with the loaded cage for nearly the entire space, the load must be drawn for the last 200 or 300 feet. Of course the empty cage must be taken back by power. The trip is made in four minutes either way; the loading requires 15 minutes and the unloading three to four minutes, so that a round trip requires about half an hour. The load consists of nine to ten sticks of timber, or 75 to 85 cubic feet, weighing about 10,000 pounds. The greatest stress on the carrier-rope is 44 tons, and on the driving-rope 3.5 tons. The strain in the carrier-rope due to its own weight is 21 tons. It is capable of resisting a strain of 196 tons, while the driving-rope will resist a strain of 16 tons. The work of getting the rope across the rapids in the river and up the ridge on the other side took eight days. Since October 1, 1885, when the work was completed, about 900,000 feet, board measure, were taken across the river. The success of this tramway has led to investigations looking to its use for similarly handling coal in the same locality, there being extensive deposits on that side of the river which are as yet inaccessible.

The Barometer and Colliery Explosions.

Prof. Edward Suess recently delivered a lecture on explosions in mines before the Geological Institute of Vienna. He stated that the supposition that atmospheric pressure had an influence on the development of explosive gases in mines had been repeatedly expressed by English experts, and barometers had consequently been placed in many English mines. French and German experts, on the contrary, have hesitated to give an opinion as to the relation of atmospheric pressure and gas accumulation in mines. Experiments have been commenced at Karwin in order, if possible, to obtain positive data, and the first report upon them, published in July of this year, clearly demonstrated that whenever the barometer sinks the quantity and intensity of explosive gases increase. A further comparison shows that of the five great catastrophes in recent times four—that of Ostrau on October 8, 1884; of Karwin on March 6, 1885; of Saarbrücken on March 18, 1885, and of Clifton Hall on June 18, 1885—took place while the barometer was sinking, whereas the explosion of Dombrau on March 27, 1885, is attributed to the presence of coal dust.

Carelessness in the Boiler-Room.

"Familiarity breeds contempt" is an old saying, remarks the *Locomotive*, and it is unfortunately true that it holds good in the boiler-room. In this case it would be wise to add to the old saw, "and contempt breeds trouble," for many accidents may be traced to the carelessness in the management of boilers which naturally follows long connection with them. Especially is this apt to be the case when a man has been so fortunate in his management of a boiler plant for a long time as to have had no serious trouble with it. It is customary with some mechanics to test new boilers, or old ones which have undergone repairs, by simply subjecting them to a high steam pressure. Why any intelligent person should do this passes our comprehension. If a boiler is known to be strong enough to sustain a certain pressure, there is no earthly reason to subject it to that pressure. If it is not absolutely certain that it will safely sustain any given pressure, then it is the height of folly, and it incurs a risk that no man can afford to take, to apply that pressure in such a manner that, in the event of the boiler not proving strong enough to sustain it, an explosion will inevitably occur. During the past year we have a record of at least three explosions, all attended by loss of life and great destruction of property, from this cause. The danger in such cases is usually greatly increased by caking the seams, rivet heads, &c., where leaks exist while the boiler is under pressure.

Another dangerous practice is the caking of joints in steam-pipes while pressure is on. If pipes or fittings are corroded, as they very frequently are in such cases, there is danger that the chisel or caking tool may be driven through the pipe. In such a case the sudden escape of steam is more than liable to seriously scald the workman. Quite recently, in a neighboring city, a workman was so seriously scalded in this manner that he died from his injuries. The practice is a very dangerous one, and should never be allowed. Of a similar nature to the above, and one which should be as strongly discountenanced, is the practice of screwing up manhole, hand hole and similar plates while boilers are under steam, to stop leakage. A great many accidents have been caused in this manner. A few years ago a battery of three horizontal tubular boilers were fired up, and on raising steam the joint of one of the manhole plates was found to leak quite badly. Instead of letting down the steam and repacking the joint, a wrench

was applied, and the attempt was made to stop the leak by screwing up on the bolt. This proving insufficient, a long piece of pipe was slipped over the handle of the wrench, and more force applied. The immediate result was the fracture of the manhole frame, the explosion of the boiler, the destruction of about \$10,000 worth of property, and the loss of three lives.

Only a few months ago a similar accident occurred in a large city in one of the Middle States, but in this case the boiler was of the sectional type. A cap covering the end of one of the water-tubes began to leak, and two men, armed with a 24-inch monkey-wrench, attempted to stop the leak by screwing up the nut on a 7/8-inch bolt, with 100 pounds of steam on the boiler. Result: one man killed and two others badly scalded. Several bad accidents have also happened through the carelessness of men who have tried to take off manhole and similar plates while boilers were under steam. This may appear incredible, but it is nevertheless true. Only a short time ago one of our inspectors, while making quarterly visits in a neighboring city, entered a boiler-room and found a man trying to remove a manhole plate with 20 pounds of steam on the boiler. He had removed the nut from the bolt, and was trying to drop the plate (in this case the boiler was provided with an internal manhole frame) into the boiler. He had just begun the job, and the plate, owing to the great pressure on it, had fortunately so far resisted his efforts to dislodge it. It may be inferred that he had a pretty loud call to "get down off that boiler," and very fortunate for him it was, too.

A few months ago a very bad accident occurred in a rubber works where two men attempted to remove the head from a vulcanizer before shutting off the steam. These vessels consist of a cylindrical shell, and the goods to be vulcanized are put in at one end, and the opening closed by a circular plate or door which is bolted to a flange on the end of the cylinder. After the men had removed some of the bolts the steam pressure proved to be too great for the remaining bolts to withstand, and the head was blown out with great force, killing them instantly, and damaging the building and machinery to a considerable extent. This list of accidents might be continued almost indefinitely, but we think we have said enough to call the attention of those interested to the fact that too much care cannot be exercised in the management of steam apparatus of all kinds. Eternal vigilance is the price of safety, and it is much easier and more practical to avoid accidents by the constant exercise of the greatest care than it is to dodge the fragments when an explosion occurs.

The considerable number of accidents which have attended the introduction and use of natural gas in Pittsburgh and vicinity have led to the formulation of various codes of rules and directions to householders and others using this fuel. Upon a card recently issued by what is known as the Philadelphia Co., and which is to be placed in every house in which gas is used, a number of valuable hints are given. The first one of these refers to the lighting of gas, and directs that the light should be placed in the grate or stove before the gas is turned on. When the gas is turned on first and a quantity of it has escaped before it becomes ignited, a slight explosion takes place. In a grate or stove filled with bricks or fancy articles this explosion is often sufficient to blow them out into the room. When the gas has been lighted it should be turned on gradually, and not all at once. The force of the gas is often sufficient to blow out the fire if it is turned on all at once. Attention is also called to the possibilities of leaks. When a leak is suspected to exist, the first thing to be done is to open all the windows and put out every light. Then a thorough search may reveal the leak after the linen of the company have been sent for. In burning the gas it is a frequent fault to turn on too much gas and heat a room too quickly. Not only does that make it impossible that the gas shall be perfectly consumed, but renders the products of the combustion larger. It may have been noticed by any one who has spent any time in a room heated by natural gas that after coming in from the fresh air and approaching the fire the air becomes less pure. That is due generally to the fact that the chimney has not sufficient space to carry away the impure air. The result of breathing this air for any length of time would be that the mouth would become dry and a severe headache would set in.

The Mechanics' Dealers' and Lumbermen's Exchange some time since appointed a committee to investigate the advisability of establishing a rolling mill in New Orleans. The exchange held its annual meeting recently and the committee reported in favor of the project. The report was adopted and the formation of a company is now going on. The plan of the enterprise is to buy up scrap iron and work it up with pig iron or old railroad iron and then roll it into bars, square, round or oval, as required by the hardware dealers. About 1000 tons of scrap iron are shipped away from New Orleans to the North and West every month and returned in the shape of bar iron. It is claimed that bar iron can be produced at New Orleans and offered for sale in that market, giving the local production an advantage over Northern mills and saving double freight—that on scrap iron shipped and bar iron returned. This item alone, it is claimed, would give the local enterprise a handsome profit.

A French work on American railroads says: "The style of construction peculiar to American locomotives is not calculated to reduce the fuel consumption to that of European locomotives. The small proportion of heating surface due to short tubes is as little qualified to utilize the heat produced by means of large grates as the very restricted use of expansion in the cylinders is to obtain the maximum work from the steam. Consequently it is not surprising that, while an average of 35 pounds of coal per locomotive mile is not considered low in France, American locomotives still average about 56 pounds."

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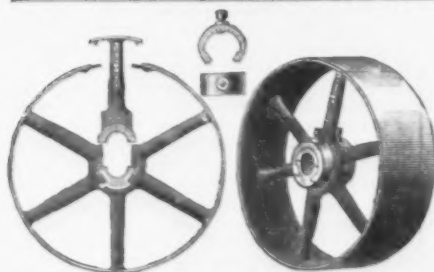
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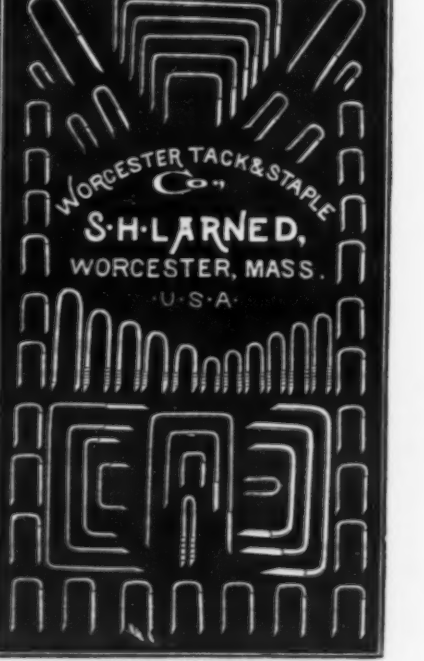
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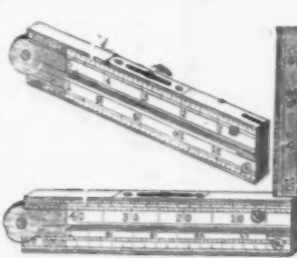
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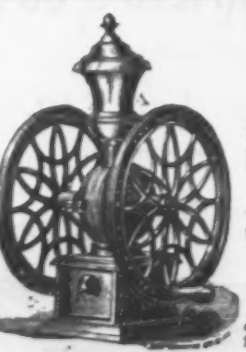
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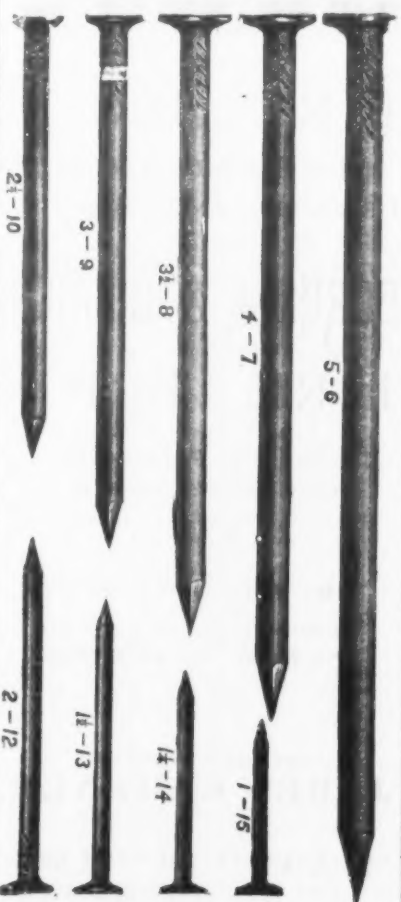
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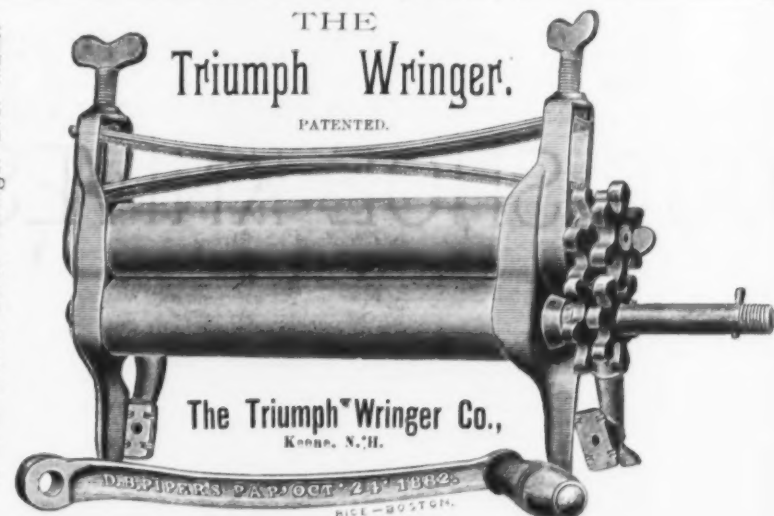


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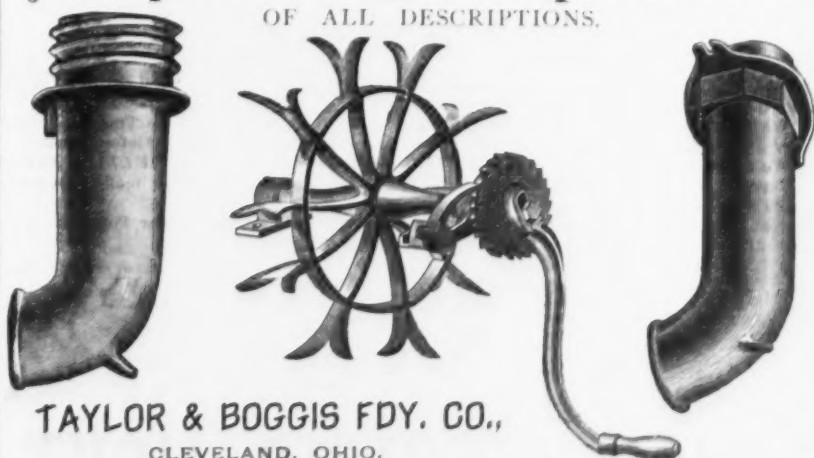
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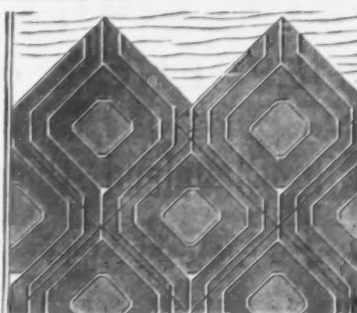
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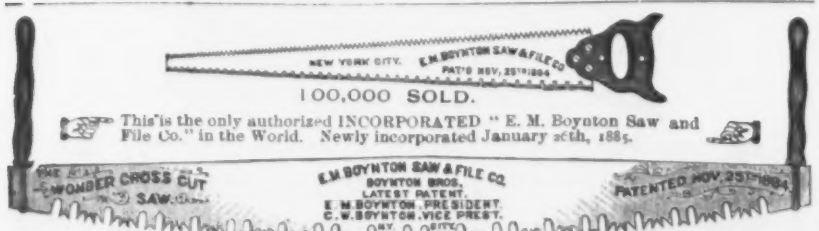
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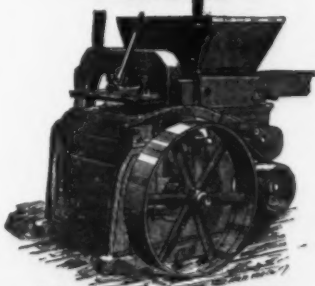
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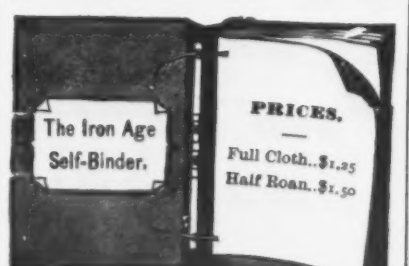
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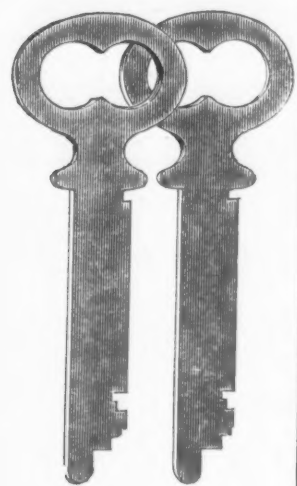
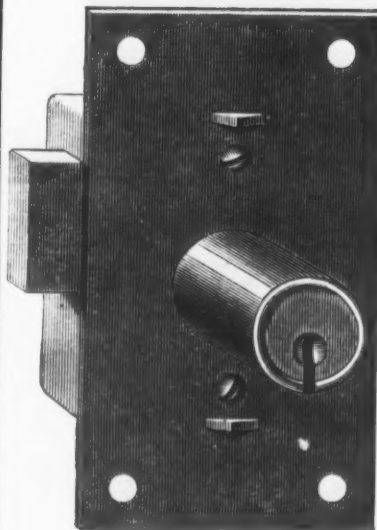
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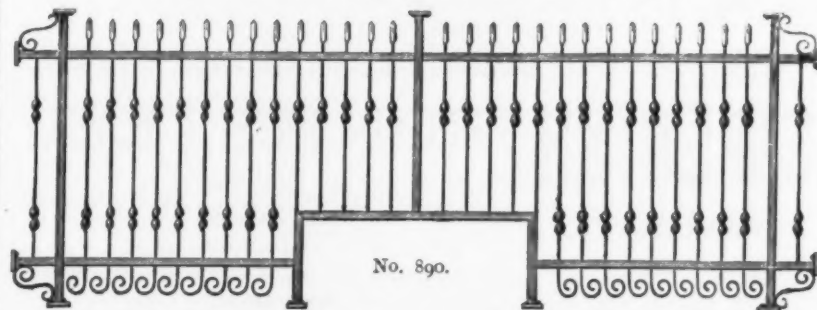
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Vacuum Chamber and Air Chamber,

Producing a continuous flow of water, both in suction and dis-
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FOR USE BY
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With the Ratchet Stock pipe can be threaded in a corner, down in wells, or in
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Terms, 30 days. For 60 or 90 days, interest added at 8 per cent. per annum.

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Peter Wright's, 100 lbs. net, \$104.00
Trenton, 100 lbs. net, 94.00
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Apple Parers.
Penn Apple Parer, \$5.00 net
White Mountain, 1880, 5.00
Lots of 10 to 25 dozen, special prices.

Axes.
Hunt's Kentucky and Yankee, 1/2 doz. net, \$5.50
William Mann, 1/2 doz. net, 5.50
Farrington & Co., 1/2 doz. net, 5.50
Beveled Axes, 1/2 doz. net, 5.50
Double Bit Axes, net, 12.00
Augers and Auger Bits.—New List January 7, 1886.

Snell's Augers and Bits, 1/2 doz. net, \$6.00
New Haven Copper Company, 1/2 doz. net, 6.00
Benjamin Pierce Auger Bits, 1/2 doz. net, 6.00
Jennings' Auger Bits, new list, Jan. 1, 1884, 25.00
Cook's Auger Bits and Augers, 1/2 doz. net, 5.50
Snell's Ship Augers, 1/2 doz. net, 5.50
Watson's Ship Augers, 1/2 doz. net, 5.50
Bonney's Pat. Hol. Augers, list \$48.00 doz. net, 40.00
Stearns' Pat. Hol. Augers, list \$48.00 doz. net, 40.00

Balances.
Light and Common, 1/2 doz. net, \$10.00
Bells.
Bever Bros. Mfg. Co. Light Hand Bells, 1/2 doz. net, 75.00
Light Hand Bells, 1/2 doz. net, 80.00
Swiss Pattern Hand Bells, 1/2 doz. net, 80.00
Connell's Door Bells, 1/2 doz. net, 20.00
Gt. Western & Kentucky Cow, new list, 70.00

Boring Machines.
Upright, without Augers, 1/2 doz. net, \$5.50
Angular, without Augers, 1/2 doz. net, 5.50
Bolts.—Eastern Carriage Bolt, new list, June 10, 1884, 100.00
Philadelphia Carriage Bolt, new list, 100.00
Stanley, Wrought Shutter, 1/2 doz. net, 60.00
Braces.—Barber's Improved, 1/2 doz. net, 40.00
Barber's Old Style, 1/2 doz. net, 50.00
Backus, Polished, 1/2 doz. net, 50.00
Backus, Nickel, 1/2 doz. net, 50.00
Spartan, 1/2 doz. net, 50.00
American Rail, 1/2 doz. net, 50.00
Amidon Improved, 1/2 doz. net, 50.00
Amidon Corner Brace, 1/2 doz. net, 50.00

Butts.—Cast Fast Joint, Narrow, 1/2 doz. net, 60.00
Cast Fast Joint, Broad, 1/2 doz. net, 60.00
Cast Loose Joint, Narrow, 1/2 doz. net, 70.00
Cast Loose Joint, Broad, 1/2 doz. net, 70.00
Cast Acorn, Loose Pin, 1/2 doz. net, 70.00
Cast Acorn, Japanese, 1/2 doz. net, 70.00
Cast Mayor's Loose Joint, 1/2 doz. net, 70.00
Wrought Loose Pin, 1/2 doz. net, 60.00
Wrought Table Hinges and Back Flaps, 1/2 doz. net, 60.00
Wrought Narrow Fast, 1/2 doz. net, 60.00

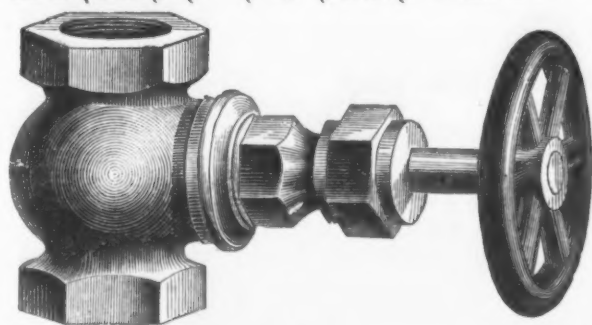
Blind Hammers.
Parker, 1/2 doz. net, \$10.00
Clark, 1/2 doz. net, 10.00
Shepard, 1/2 doz. net, 10.00
Lull & Porter, 1/2 doz. net, 10.00
Huffer's, 1/2 doz. net, 10.00
Casters.—Bed (new list July 1, 1880), 1/2 doz. net, 60.00
Plate, 1/2 doz. net, 60.00
Chains.—German Halter and Coll. list, June, 1884, 1/2 doz. net, 50.00
Galvanized Pump, 1/2 doz. net, 50.00
Best Proof Coil Chain—English, 1/2 doz. net, 50.00

Chisels.—Socket Framing, 1/2 doz. net, 10.00
Socket Framing, 1/2 doz. net, 10.00
Butcher's, 1/2 doz. net, 10.00
Coffee Mills.—Box and Side new list, Jan. 1, 1880, 1/2 doz. net, 40.00
Cutlery.—Walden Pocket, 1/2 doz. net, 20.00
Pennsylvania Knife Co., new list, net, 20.00
Landers, Frary & Clark, Russell & Co., Lamson & Goodnow Mfg. and Meriden Cutlery Co., Manufacturers' prices net.

Door Hangers.—Trunk Barn Door Hangers, No. 1, \$12.00; No. 2, \$10.00; No. 3, \$8.00
Drawing Knives.
Hart Mfg. Co., 1/2 doz. net, 75.00
Adjustable Handle, 1/2 doz. net, 20.00
Fry Pans.
Tinned, 1/2 doz. net, 45.00
No. 1, 1/2 doz. net, 45.00
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No. 3, 1/2 doz. net, 45.00
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Crown—3/8 in. roll, each, 4.50
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Crown—1/128 in. roll, each, 7.50
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Crown—1/618970019642690137449562112 in. roll, each, 48.50
Crown—1/1237940039285380274899124224 in. roll, each, 49.00
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Crown—1/9903520314283042199192993792 in. roll, each, 50.50
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Crown—1/39614081257132168796771975168 in. roll, each, 51.50
Crown—1/79228162514264337593543950336 in. roll, each, 52.00
Crown—1/158456325028528675187087900672 in. roll, each, 52.50
Crown—1/316912650057057350374175801344 in. roll, each, 53.00
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Crown—1/1267650600228229401496703205376 in. roll, each, 54.00
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Crown—1/5070602400912917605986812821504 in. roll, each, 55.00
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Crown—1/11150372562400404678356979136324180505590208 in. roll, each, 75.50
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Crown—1/17840596099840647485371166618118688808944328 in. roll, each, 77.50
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Crown—1/28544953759745035976593866588989902094310912 in. roll, each, 79.50
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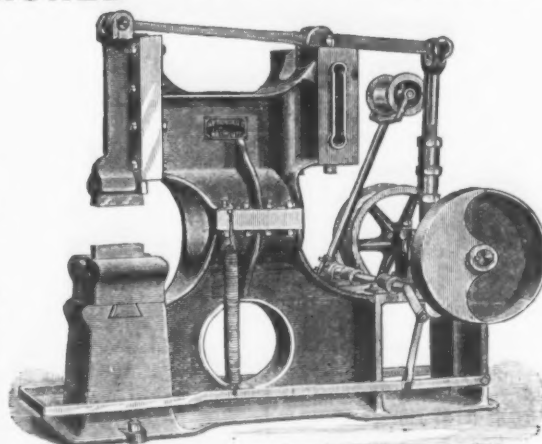
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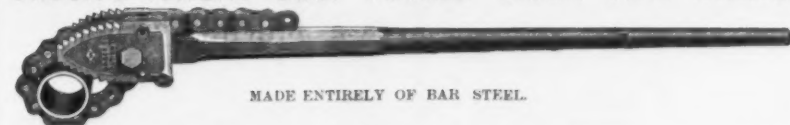
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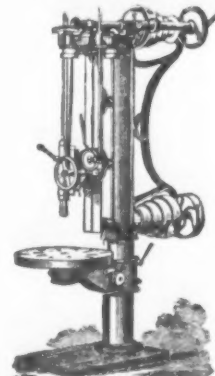
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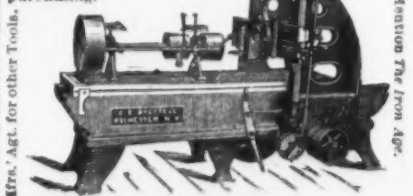
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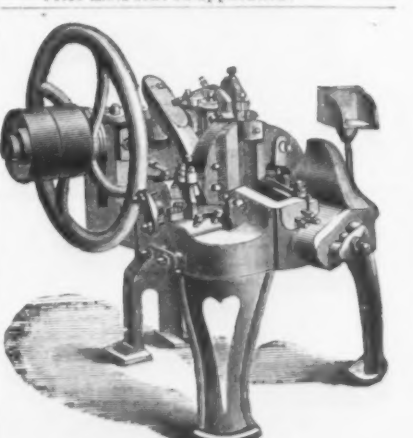


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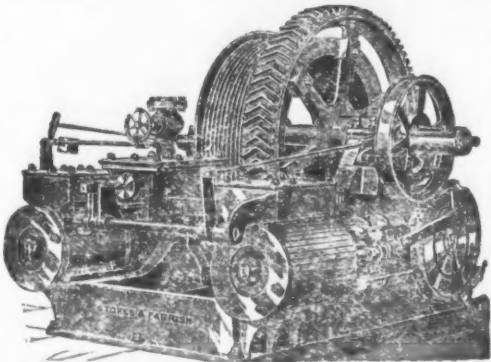


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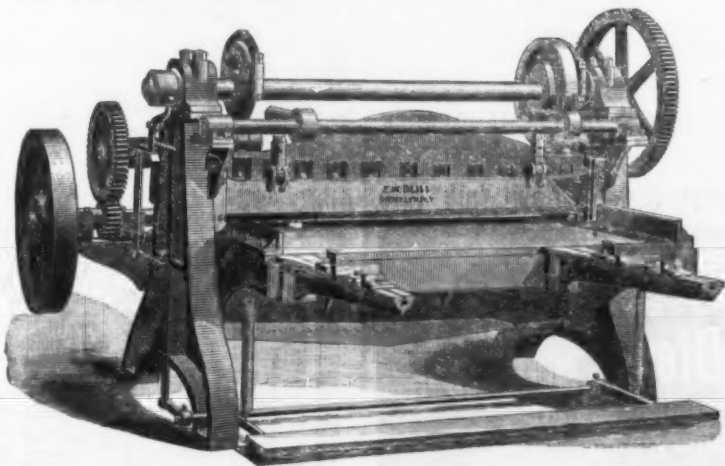
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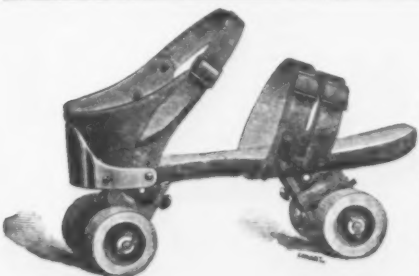
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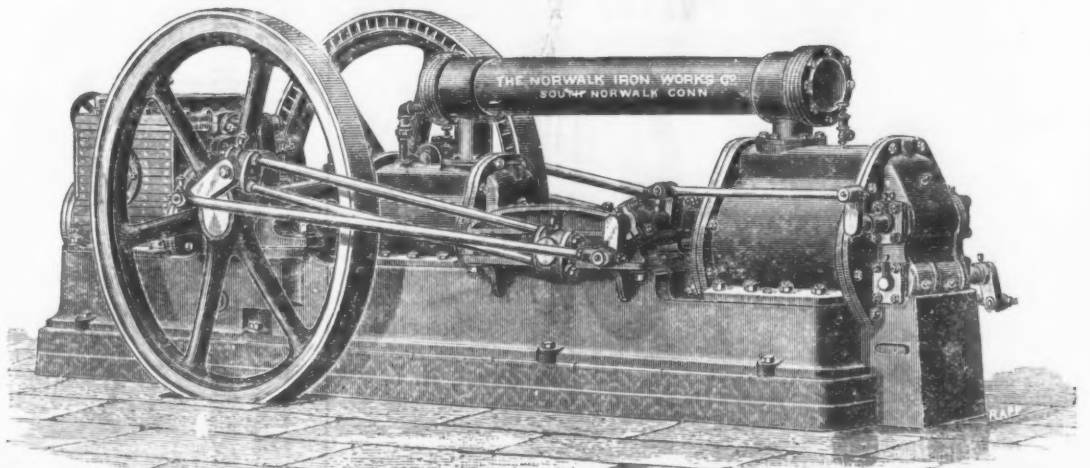
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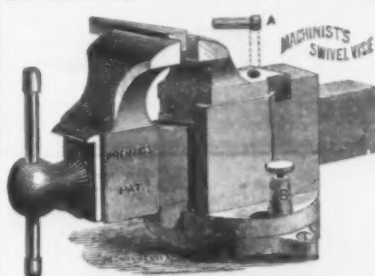


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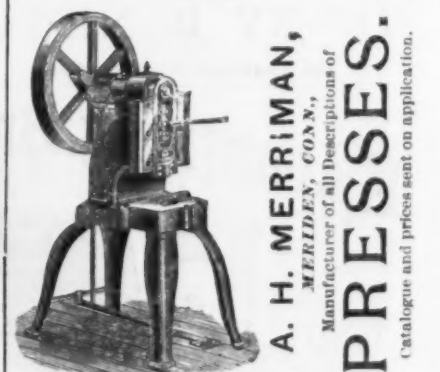
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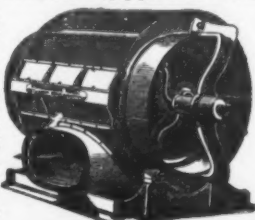
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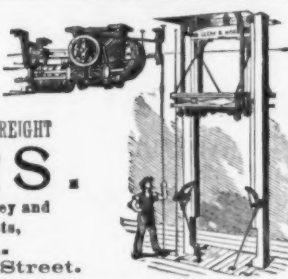
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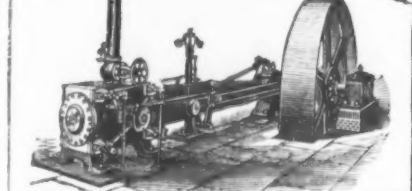
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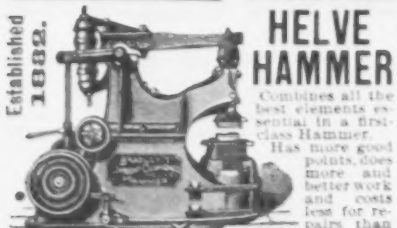
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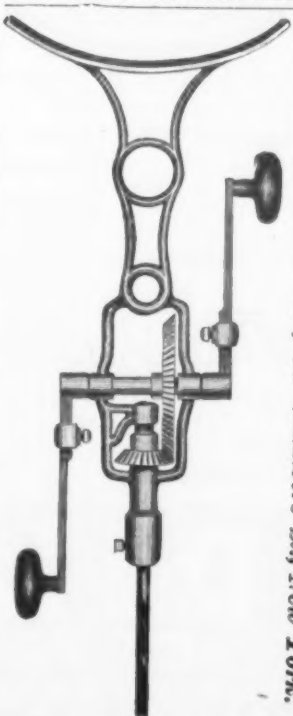
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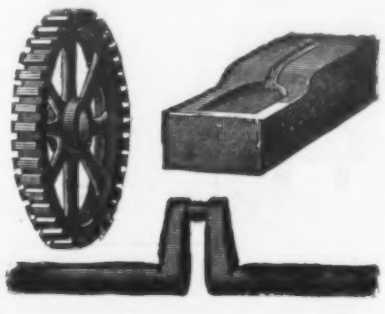
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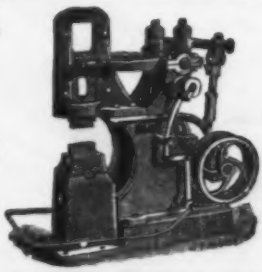
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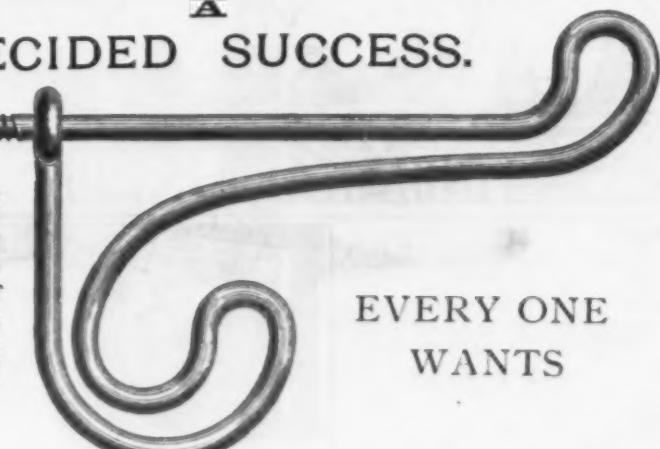
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